



***The interface between  
data collection and data processing***

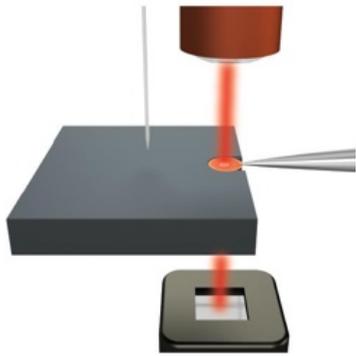
Henning Stahlberg

*Center for Cellular Imaging and NanoAnalytics (C-CINA)*

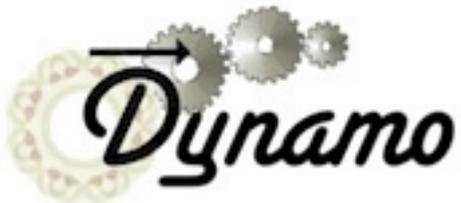
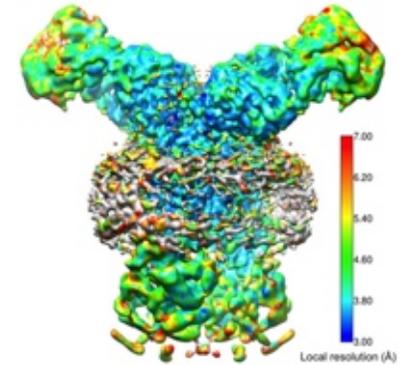
*Biozentrum, University of Basel, Switzerland*

## Parkinson's Disease

Cryo-Writer



Membrane Proteins



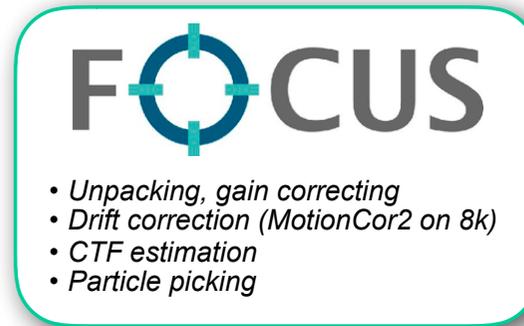
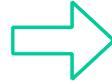
MRCZ



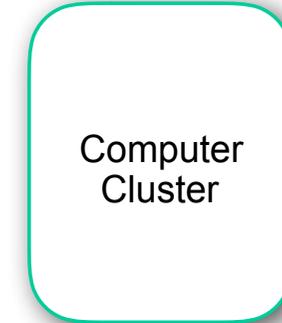
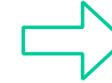
# FOCUS: The interface between data collection and data processing



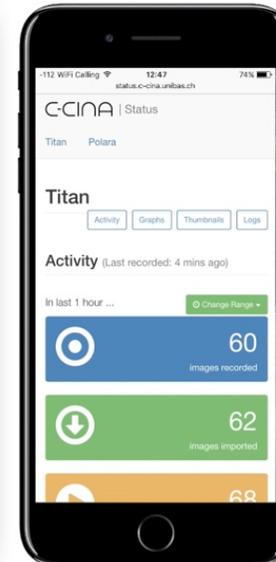
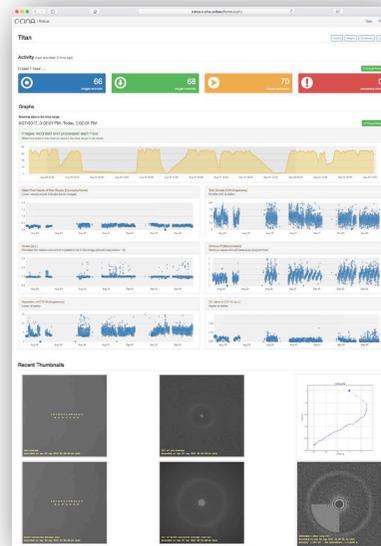
70 to 120 movies / hour



up to 130 movies / hour (4 x Titan Xp GPU)



<http://status.c-cina.unibas.ch>



# FOCUS: The interface between data collection and data processing

[www.focus-em.org](http://www.focus-em.org)



Built on the tradition of **2DX** and **2dx\_automator**:

- **GUI**-based project overview
- Parallel processing of repeated tasks
- User-editable scripts for *any scriptable tasks* (2dx is now a subset of FOCUS)



Focus: The interface between data collection and data processing in cryo-EM



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<sup>a</sup>Center for Cellular Imaging and NanoAnalytics (C-CINA), Biozentrum, University of Basel, Basel, Switzerland  
<sup>b</sup>BioEM Lab, C-CINA, Biozentrum, University of Basel, Basel, Switzerland

**GUI:** Qt5

**Backend:** C++

**Scripts:** (t)csh or Python

**Auxiliary programs:** C++, Fortran, Python

**Dedicated external tools:** Many, user dependent.

**Status web page:** HTML, CSS, Javascript, Bootstrap 3

## FOCUS – How to install

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[www.focus-em.org](http://www.focus-em.org)

### Compile from source (*recommended*):

```
$ git clone https://github.com/C-CINA/focus.git
$ cd focus
$ ./build_all [build_dir] [install_dir]
```

### *or Download pre-built binaries. (Linux, OSX):*

<https://focus.c-cina.unibas.ch/download.php>

### **Dependencies for compiling:**

cmake, FFTW, Qt, gfortran, g++

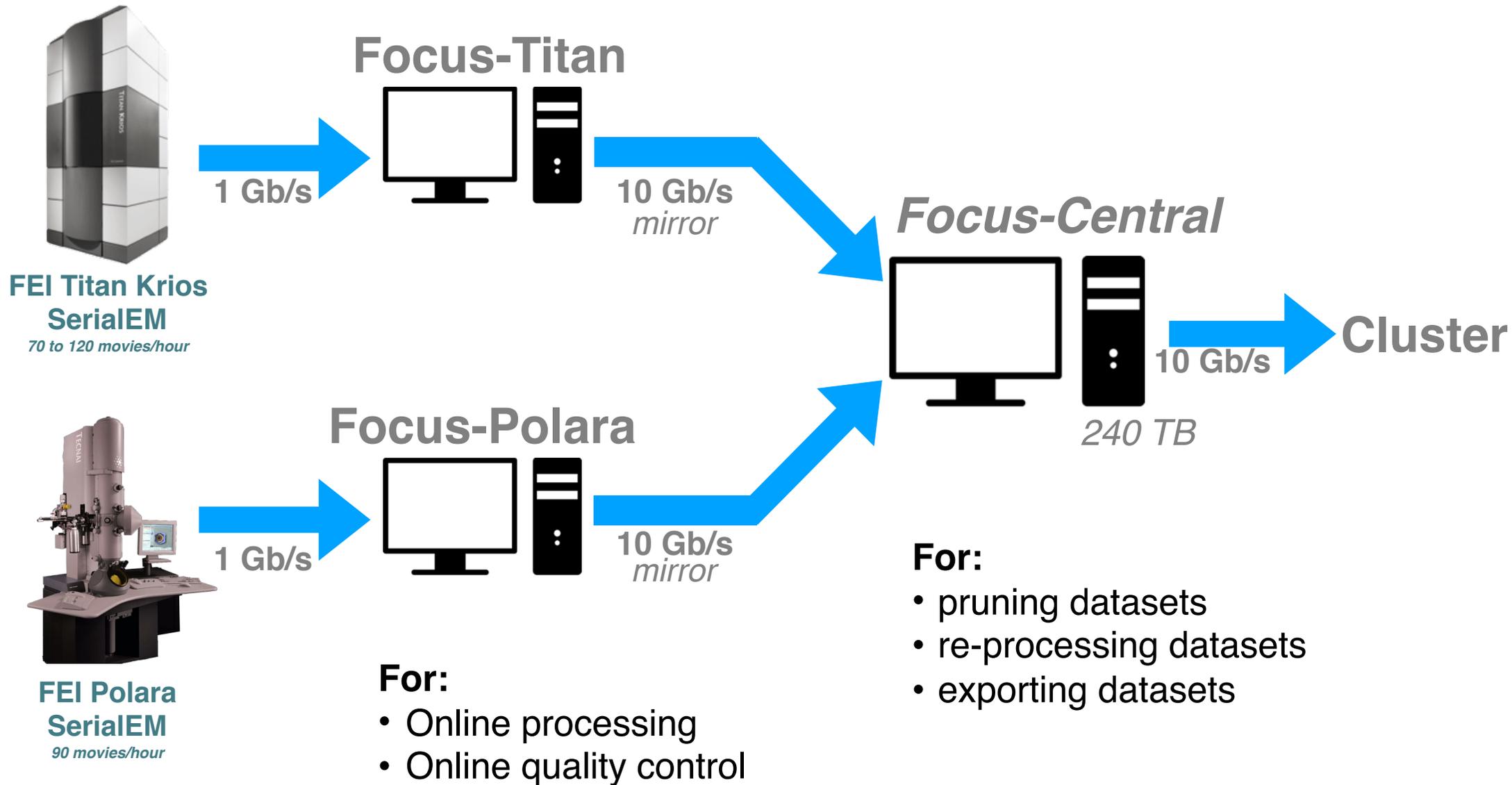
### **Dependencies for running:**

Usage-dependent third-party programs

(MotionCor2, gCTF, CTFFIND4.1, IMOD, EMAN2, RELION, ...)

*See full list of dependencies on the [Focus Wiki](#)*

# FOCUS – Hardware Recommendations



# FOCUS – Hardware Recommendations

## Focus-Titan

- ✓ 2x14-core CPU
- ✓ 90 TB storage (RAID6)
- ✓ 768 GB RAM  
(of which **384 GB as RAM disk**)
- ✓ **4x NVIDIA Titan Xp GPU**
- ✓ 10 Gb/s Ethernet
- ✓ 4k display

*Up to 130 movies/hour  
8k x 8k, 50frames*

## Focus-Polara

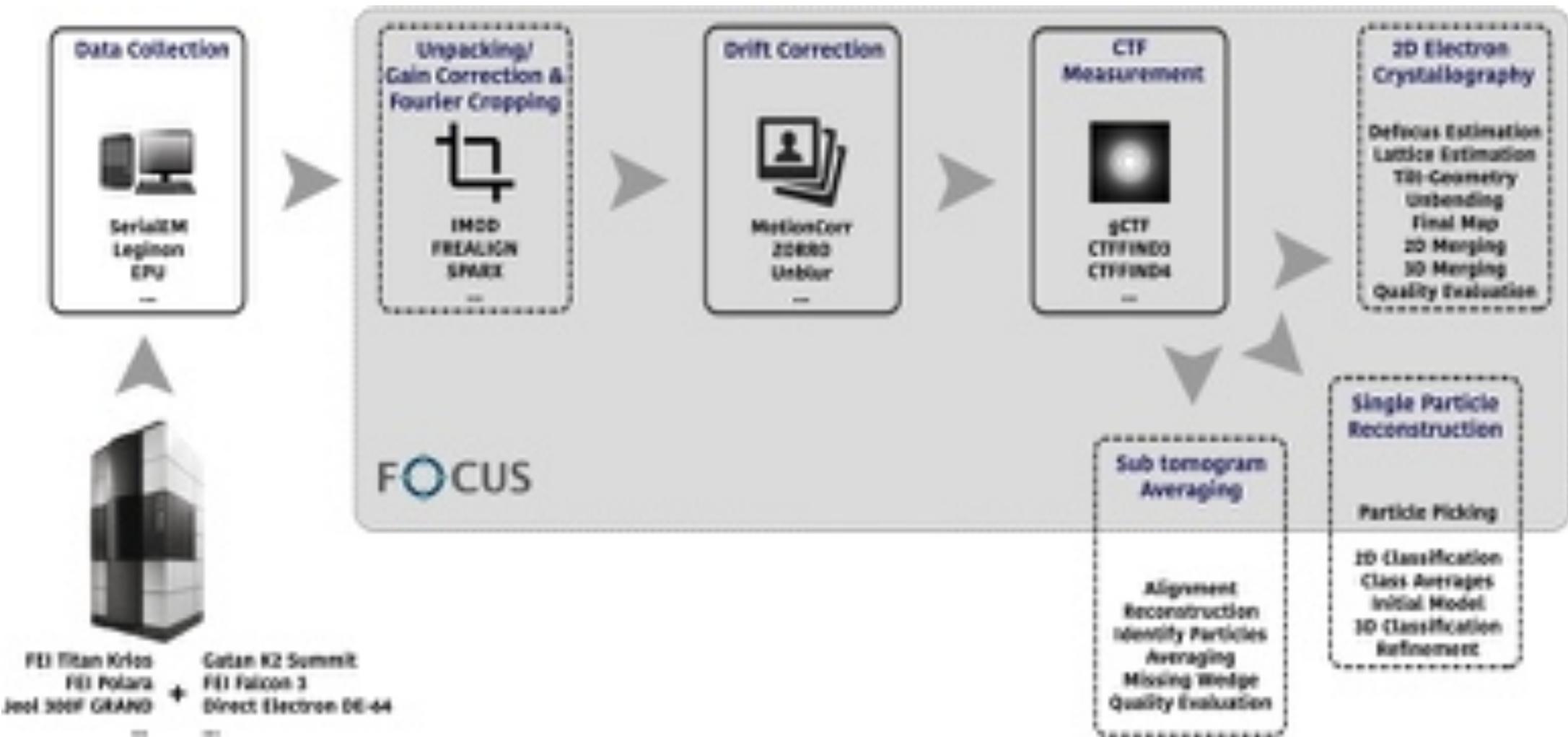
- ✓ 2x12-core CPU
- ✓ 70 TB storage (RAID6)
- ✓ 256 GB RAM
- ✓ **1.1 TB PCIe SSD**
- ✓ **2x NVIDIA GTX-1080 GPU**
- ✓ 10 Gb/s Ethernet
- ✓ 4k display

## Focus-Central

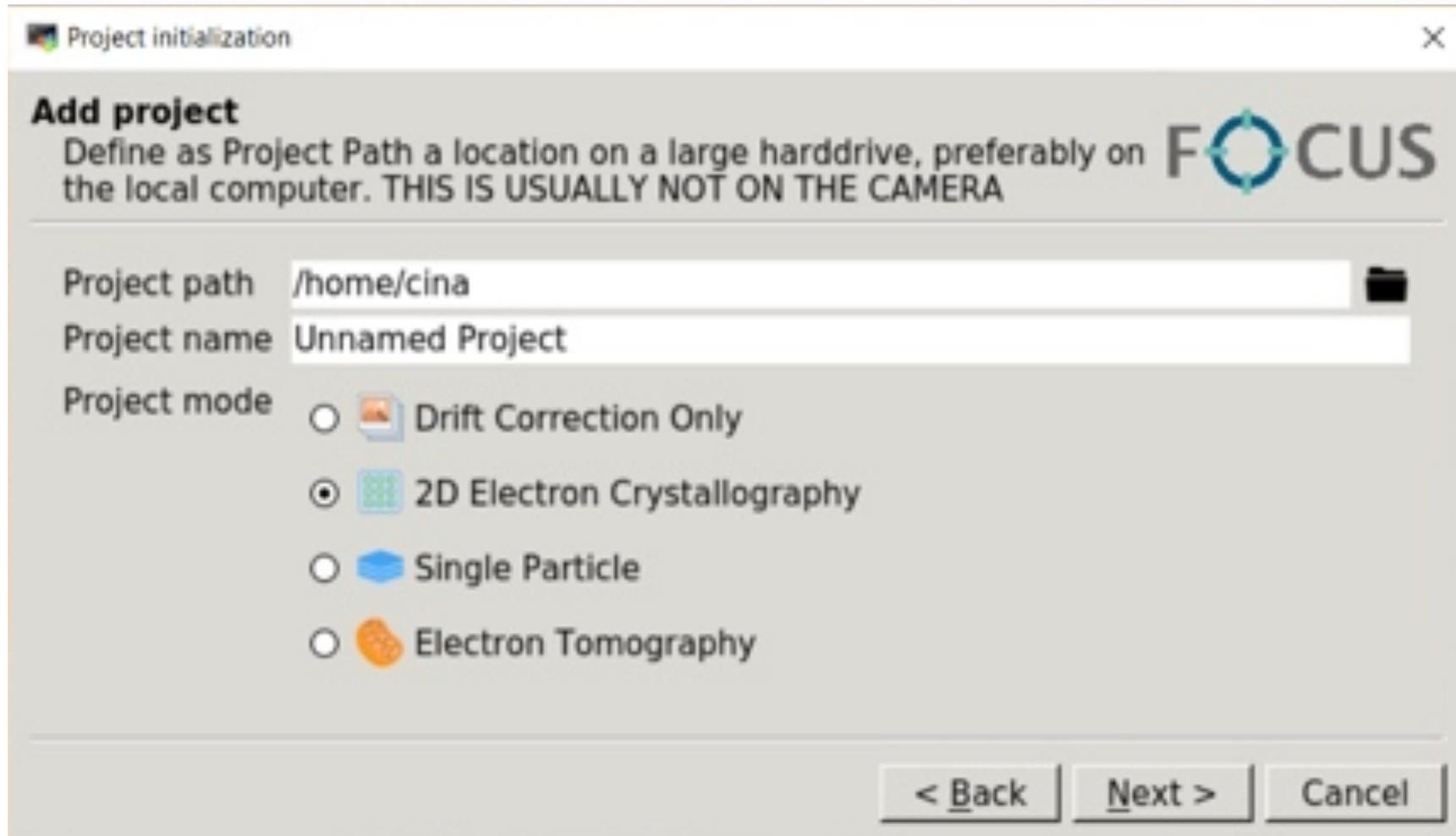
- ✓ 2x14-core CPU
- ✓ **240 TB storage (RAID6)**
- ✓ 256 GB RAM
- ✓ **1.5 TB PCIe SSD**
- ✓ **2x NVIDIA GTX-1080 Ti GPU**
- ✓ 10 Gb/s Ethernet
- ✓ 4k display

**Mirror**

# FOCUS – Workflow



# FOCUS – Project Wizzard



The screenshot shows a window titled "Project initialization" with a close button (X) in the top right corner. The main heading is "Add project". Below the heading is a descriptive text: "Define as Project Path a location on a large harrdrive, preferably on the local computer. THIS IS USUALLY NOT ON THE CAMERA". To the right of this text is the FOCUS logo, which consists of the word "FOCUS" in a bold, sans-serif font, with a blue circular icon containing four arrows pointing outwards between the 'O' and 'C'. Below the text are three input fields: "Project path" with the value "/home/cina" and a folder icon on the right; "Project name" with the value "Unnamed Project"; and "Project mode" with four radio button options: "Drift Correction Only" (with a camera icon), "2D Electron Crystallography" (with a grid icon and selected), "Single Particle" (with a blue cube icon), and "Electron Tomography" (with an orange sphere icon). At the bottom right of the dialog are three buttons: "< Back", "Next >", and "Cancel".

**Add project**  
Define as Project Path a location on a large harrdrive, preferably on the local computer. THIS IS USUALLY NOT ON THE CAMERA

Project path  

Project name

Project mode

-  Drift Correction Only
-  2D Electron Crystallography
-  Single Particle
-  Electron Tomography

< Back | Next > | Cancel

# FOCUS – The GUI

The screenshot displays the FOCUS GUI interface. At the top, the title bar shows 'Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir'. The main menu includes 'Project', 'Library', 'Import', 'Process', 'Datasets', and 'Export'. The 'Import' tab is active, showing 'IMPORT MOVIES AND IMAGES'.

**File Import Setting**

Directory, where sub-folders are located that contain the files to import:  


- Import new images in the import folder on start
- Continuously import new images in the import folder
- DELETE the original images in import folder after importing them

**Import From**

Sub-folder with 2D images:   
 Sub-folder with drift-corrected stacks:   
 Sub-folder with raw stacks:   
 What type is the raw input stack?:   
 Defect pixel list original file location:   
 Gain reference original file location:   
 Ignore files with this text string in file name:

**Import To**

Target directory to import files into:   
 Suffix for import folder:

**Process Imported Images**

Select scripts:  to run WHILE importing |  to run AFTER import (in job queue)  
 Prioritize imported images, so that newest images are processed first

Scripts to be executed (Blue: While Importing, Black: After Import)

- import\_Movie from SerialEM
- Align w/ MotionCor2
- gCTF (on average)
- Measure Iciness
- Push Status data
- Clean SCRATCH disk after Processing
- Sync with central

**Current Status**

2 image(s) found in folder of which 0 image(s) are to be imported  
   
 Original images will be DELETED after import! If not intended, change the option on left.

**Import Options**

Parameters to be deduced from file names:  
   
 Import delay time:  
 Number of seconds to wait before starting import of fresh (newly created) images:

**Import Folder Details**

Directory to Create	File Name to Import	2D Image	Aligned Stack	Raw Stack
Not yet ready	chao_147-22_Mar15_14.10.10	X	X	✓
Not yet ready	chao_147-22_Mar15_14.10.35	X	X	✓

# FOCUS – Preferences: Once for a microscope

The screenshot displays the FOCUS software interface with the Preferences dialog box open. The main window shows the 'IMPORT MOVIES AND IMAGES' section with various settings for file import and processing. The Preferences dialog box is titled 'Preferences' and has tabs for General, Microscope, System, Software, Status, Viewers, and Font. The 'Microscope' tab is selected, showing the following parameters:

- Default Microscope CS: 2.7
- Default Microscope High Tension [kV]: 300.0
- Default PhasePlate setting: Do you have a phase plate?  Yes  No

The dialog box also has a 'Close' button at the bottom right. In the background, the main window shows a table with columns '2D Image', 'Aligned Stack', and 'Raw Stack', and rows of 'x' and '✓' marks.

# FOCUS – Preferences: Once for a microscope

The screenshot displays the FOCUS software interface. The main window is titled 'Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir'. The 'Import Movies and Images' section is active, showing 'File Import Setting' and 'Import From' options. A 'Preferences' dialog box is overlaid on the main window, showing the 'Viewers' tab. The dialog has a toolbar with icons for General, Microscope, System, Software, Status, Viewers, and Font. The 'Viewers' tab contains a list of viewers and their default settings:

Viewer	Default
Script Editor	sublime
Web Browser	firefox
PS Image Viewer	evince
PDF Viewer	evince
PNG Image Viewer	eog
3D Viewer	3dmod
TIFF Images Viewer	firefox
Stack image viewer	3dmod

The dialog also has a 'Close' button at the bottom right. In the background, the main software window shows a toolbar with 'Library', 'Import', 'Process', 'Datasets', and 'Export' buttons. The 'Import' button is highlighted. The 'Current Status' section shows '2 Image(s) found in folder of which 0 Image(s) are to be imported'. The 'Import From' section shows a list of sub-folders and their corresponding image types. The 'Process Imported Images' section shows a list of scripts to be executed.

# FOCUS – Preferences: Once for a microscope

The screenshot displays the FOCUS software interface. The main window is titled "Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir". The interface includes a toolbar with icons for Library, Import, Process, Datasets, and Export. The main area is divided into sections for "IMPORT MOVIES AND IMAGES", "File Import Setting", "Import From", "Import To", and "Process Imported Images".

The "Preferences" dialog box is open, showing the "Software" tab. It contains the following sections:

- General Software Setup**
  - Python: /usr/local/cina/EMAN2/bin/python
  - Cadaver executable: /usr/bin/cadaver
  - Anacoda Python: /usr/local/cina/EMAN2/bin/python
  - GAWK: /usr/bin/gawk
- Drift Corrector Software Setup**
  - Unblur executable: /usr/local/cina/unblur\_1.0.2/bin/unblur\_openmp\_7\_17\_15.exe
  - Motioncor2 executable: /usr/local/cina/MotionCor2/MotionCor2-1.0.0
- Image Processing Software Setup**
  - gctf executable: /usr/local/cina/Gctf\_v1.06/bin/Gctf-v1.06\_sm\_30\_cu8.0\_x86\_64
  - ctffind4 executable: /usr/local/cina/CTFFIND4/ctffind
  - gautomatch executable: /usr/local/cina/Gautomatch\_v0.53/bin/Gautomatch-v0.53\_sm\_20\_cu8.0\_x86\_64
  - EMAN2 installation directory: /usr/local/cina/EMAN2
  - IMOD installation directory: /usr/local/cina/IMOD/IMOD
  - Frealign installation directory: /usr/local/cina/frealign\_v9.11
  - RELION installation directory: /usr/local/cina/relion

The dialog box has a "Close" button at the bottom right. The background application window shows a status bar with the text "2 Image(s) found in folder of which 0 Image(s) are to be imported" and a table with columns "2D Image", "Aligned Stack", and "Raw Stack".

# FOCUS – The IMPORT Queue

The screenshot displays the FOCUS software interface for the 'Import' function. The 'Import' button is highlighted with an orange box. The interface is divided into several sections:

- File Import Setting:** Directory for import: `/mnt/gatan0/users/PSI_Vladimir`. Options include 'Import new images in the import folder on start', 'Continuously import new images in the import folder', and 'DELETE the original images in import folder after importing them'.
- Import From:** Sub-folders and file types. Includes 'Sub-folder with 2D images' (images), 'Sub-folder with drift-corrected stacks' (aligned), 'Sub-folder with raw stacks' (raw), and 'What type is the raw input stack?' (1-Dark-subtracted).
- Import To:** Target directory to import files into: 'auto'. Suffix for import folder: 'None'.
- Process Imported Images:** Select scripts: 'to run WHILE importing' and 'to run AFTER import (in job queue)'. Includes 'Prioritize imported images, so that newest images are processed first'.
- Import Folder Details:** A table showing the import queue.

Directory to Create	File Name to Import	2D Image	Aligned Stack	Raw Stack
Not yet ready	chao_147-22_Mar15_14.10.10	X	X	✓
Not yet ready	chao_147-22_Mar15_14.10.35	X	X	✓

# FOCUS – The IMPORT Queue

The screenshot displays the Focus (1.1.0) software interface. At the top, the title bar shows "Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir". The main menu includes "Project", "Library", "Import" (highlighted with an orange box), "Process", and "Datasets".

The "IMPORT MOVIES AND IMAGES" section is active, showing "File Import Setting" with the following options:

- Directory, where sub-folders are located that contain the files to import: /mnt/gatan01users/PSI\_Vladimir
- Import new images in the import folder on start
- Continuously import new images in the import folder
- DELETE the original images in import folder after importing them

The "Import From" section includes:

- Sub-folder with 2D images: images
- Sub-folder with drift-corrected stacks: aligned
- Sub-folder with raw stacks: raw
- What type is the raw input stack?: 1=Dark-subtracted
- Defect pixel list original file location: /mnt/gatan01users/PSI\_Vladimir/raw/defects\_test1\_Mar13\_15.03.33.txt
- Gain reference original file location: /mnt/gatan01users/PSI\_Vladimir/raw/SuperRef\_test1\_Mar13\_15.03.33.dm4
- Ignore files with this text string in file name: (empty)

The "Import To" section includes:

- Target directory to import files into: auto
- Suffix for import folder: 0=None

The "Process Imported Images" section includes:

- Select scripts:  to run WHILE importing,  to run AFTER import (in job queue)
- Prioritize imported images, so that newest images are processed first
- Scripts to be executed (Blue: While Importing, Black: After Import):
  - import Movie from SerialEM
  - Align w/ MotionCor2
  - gCTF (on average)
  - Measure Iciness
  - Push Status data
  - Clean SCRATCH disk after Processing
  - Sync with central

The right-hand side of the interface shows the "Current Status" section, which reports "2 image(s) found in folder of which 0 image(s) imported". It includes buttons for "Start Import" and "Rescan Import Folder", and a warning: "Original images will be DELETED after import!". Below this is the "Import Options" section, which includes "Parameters to be deduced from file names:" and "Import delay time:". The "Import Folder Details" section shows a table with two rows, both labeled "Not yet ready".

# FOCUS – The IMPORT Queue

The screenshot displays the FOCUS software interface. At the top, the title bar reads "Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir". The main menu includes "Project", "Import", "Datasets", and "Export". The "Import" button is highlighted with an orange box.

**IMPORT MOVIES AND IMAGES**

**File Import Setting**

Directory, where sub-folders are located that contain the files to import:  
/mnt/gatan0/users/PSI\_Vladimir

Import new images in the import folder on start  
 Continuously import new images in the import folder  
 DELETE the original images in import folder after importing them

**Import From**

Sub-folder with 2D images: images  
Sub-folder with drift-corrected stacks: aligned  
Sub-folder with raw stacks: raw  
What type is the raw input stack?: 1-Dark-subtracted  
Defect pixel list original file location: /mnt/gatan0/users/PSI\_Vladimir/raw/defects\_test1\_Mar13\_15.03.33.txt  
Gain reference original file location: /mnt/gatan0/users/PSI\_Vladimir/raw/SuperRef\_test1\_Mar13\_15.03.33.dm4  
Ignore files with this text string in file name:

**Import To**

Target directory to import files into: auto  
Suffix for import folder: None

**Process Imported Images**

Select scripts:  to run WHILE importing |  to run AFTER import (in job queue)  
 Prioritize imported images, so that newest images are processed first

Scripts to be executed (Blue: While Importing, Black: After Import)

- import\_Movie\_from\_SerialEM
- Align w/ MotionCor2
- gCTF (on average)
- Measure Iciness
- Push Status data
- Clean SCRATCH disk after Processing
- Sync with central

**2 Image(s) found in folder of which 0 Image(s) are to be imported**

Original images will be DELETED after import! If not intended, change the option on left.

**Import Options**

Parameters to be deduced from file names:  
<specimen\_name>\_<specimennumber>\_<specimen\_recording\_day>\_<specimen\_recording\_time> Change Pattern

**Import delay time:**  
Number of seconds to wait before starting import of fresh (newly created) images: 90

**Import Folder Details**

Directory to Create	File Name to Import	2D Image	Aligned Stack	Raw Stack
Not yet ready	chao_147-22_Mar15_14.10.10	X	X	✓
Not yet ready	chao_147-22_Mar15_14.10.35	X	X	✓

# FOCUS – Import Panel: Learn parameters from file names

The screenshot displays the FOCUS software interface. The top bar shows the project name and directory. The main window is divided into several panels. The 'Import' button is highlighted with an orange box. Below it, the 'Import Setting' panel is visible, with the 'Import delay time' field highlighted by another orange box. The 'Import Folder Details' panel shows a table of files to be imported.

Directory to Create	File Name to Import	2D Image	Aligned Stack	Raw Stack
Not yet ready	chao_147-22_Mar15_14.10.10	X	X	✓
Not yet ready	chao_147-22_Mar15_14.10.35	X	X	✓

A dialog box titled 'FOCUS' is overlaid on the interface. It contains the following text:

Separator (delimiter) in file name, e.g., underscore character ' \_ ':

Select The Parameters Expected (First To Last)

**DUMMY**

- specimen\_name
- specimennumber
- tomo\_series\_number
- TLTANG
- specimen\_recording\_day
- specimen\_recording\_time

**Selected Parameters**

- specimen\_name
- specimennumber
- specimen\_recording\_day
- specimen\_recording\_time

Buttons: Continue, Cancel

# FOCUS – Process Tab: The Job Queue

FOCUS (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Project Library Images **Process** Settings Export Preferences

PROCESS IMAGES  
Parallel Processing  
Concurrency Selection  
Number of jobs to run in parallel: 14  
The maximum number of threads on your system is: 28

Processing Queue  
Add Images Prioritize Clear All Clear Selected

Images in queue  
auto -> 0000002514  
auto -> 0000002513  
auto -> 0000000566  
auto -> 0000000559  
auto -> 0000000575  
auto -> 0000000600  
auto -> 0000000560  
auto -> 0000000563  
auto -> 0000000557  
auto -> 0000000558  
auto -> 0000000564  
Import Movie from SerialEM  
Align w/ MotionCor2  
gCTF (on average)  
Measure Ichness  
Push Status data  
Clean SCRATCH disk after Processing  
Sync with central  
auto -> 0000000572  
Import Movie from SerialEM  
Align w/ MotionCor2  
gCTF (on average)  
Measure Ichness  
Push Status data  
Clean SCRATCH disk after Processing  
Sync with central  
auto -> 0000000576  
auto -> 0000000567  
auto -> 0000000561  
auto -> 0000000781  
auto -> 0000000738  
auto -> 0000000740  
auto -> 0000000741  
auto -> 0000002453  
auto -> 0000002438  
auto -> 0000002450  
auto -> 0000000802  
auto -> 0000000831  
auto -> 0000000832  
auto -> 0000000962  
auto -> 0000000801  
auto -> 0000002448  
auto -> 0000000964  
auto -> 0000001266  
auto -> 0000002059  
auto -> 0000002060  
auto -> 0000001442  
auto -> 0000001443  
auto -> 0000001446  
auto -> 0000001520  
auto -> 0000001542  
auto -> 0000001541  
auto -> 0000001652  
auto -> 0000001636  
auto -> 0000001666  
auto -> 0000001654  
auto -> 0000001935  
auto -> 0000001867  
auto -> 0000001856  
auto -> 0000001855  
auto -> 0000001857  
auto -> 0000001899  
auto -> 0000001934  
auto -> 0000001933  
auto -> 0000002055  
auto -> 0000002061  
auto -> 0000002054  
auto -> 0000002258  
auto -> 0000002154  
auto -> 0000002152  
auto -> 0000002161  
auto -> 0000002259  
auto -> 0000002451  
auto -> 0000002480  
auto -> 0000002481  
auto -> 0000003504  
auto -> 0000002474  
auto -> 0000002477  
auto -> 0000002478

Current Status  
Processing, 65 Images are in queue  
Stop Processing  
Automatically start processing, once there are images in queue

id	Image	Process
9	auto -> 0000002506 14:16:12.313 Saving results from script: process_push_status	
9	auto -> 0000002506 14:16:12.335 Executing: process_clean_scratch	
9	auto -> 0000002506 14:16:12.888 Saving results from script: process_clean_scratch	
9	auto -> 0000002506 14:16:12.909 Executing: central_rsync	
8	auto -> 0000002505 14:16:13.900 Saving results from script: process_ctf	
8	auto -> 0000002505 14:16:13.932 Executing: process_ichness	
8	auto -> 0000002505 14:16:14.323 Saving results from script: process_ichness	
8	auto -> 0000002505 14:16:14.351 Executing: process_push_status	
8	auto -> 0000002505 14:16:14.612 Saving results from script: process_push_status	
8	auto -> 0000002505 14:16:14.633 Executing: process_clean_scratch	
8	auto -> 0000002505 14:16:16.021 Saving results from script: process_clean_scratch	
8	auto -> 0000002505 14:16:16.042 Executing: central_rsync	
3	auto -> 0000002512 14:16:17.649 STARTING =====	
3	auto -> 0000002512 14:16:17.704 Executing: import_serialem	
1	auto -> 0000002509 14:16:35.909 Saving results from script: import_serialem	
1	auto -> 0000002509 14:16:35.947 Executing: import_driftcor_motioncor2	
6	auto -> 0000002503 14:16:36.780 Saving results from script: central_rsync	
6	auto -> 0000002503 14:16:36.828 FINISHED =====	
7	auto -> 0000002504 14:16:38.166 Saving results from script: central_rsync	
7	auto -> 0000002504 14:16:38.187 FINISHED =====	
2	auto -> 0000002510 14:16:40.524 Saving results from script: import_serialem	
2	auto -> 0000002510 14:16:40.561 Executing: import_driftcor_motioncor2	
11	auto -> 0000002511 14:16:45.190 Saving results from script: import_serialem	
11	auto -> 0000002511 14:16:45.235 Executing: import_driftcor_motioncor2	
0	auto -> 0000002507 14:17:00.170 Saving results from script: import_driftcor_motioncor2	
0	auto -> 0000002507 14:17:00.208 Executing: process_ctf	
0	auto -> 0000002507 14:17:04.910 Saving results from script: process_ctf	
0	auto -> 0000002507 14:17:04.950 Executing: process_ichness	
0	auto -> 0000002507 14:17:05.336 Saving results from script: process_ichness	
0	auto -> 0000002507 14:17:05.394 Executing: process_push_status	
0	auto -> 0000002507 14:17:05.662 Saving results from script: process_push_status	
0	auto -> 0000002507 14:17:05.715 Executing: process_clean_scratch	
0	auto -> 0000002507 14:17:06.328 Saving results from script: process_clean_scratch	
0	auto -> 0000002507 14:17:06.361 Executing: central_rsync	
10	auto -> 0000002508 14:17:17.168 Saving results from script: import_driftcor_motioncor2	
10	auto -> 0000002508 14:17:17.726 Executing: process_ctf	
10	auto -> 0000002508 14:17:22.350 Saving results from script: process_ctf	
10	auto -> 0000002508 14:17:22.389 Executing: process_ichness	
10	auto -> 0000002508 14:17:22.761 Saving results from script: process_ichness	
10	auto -> 0000002508 14:17:23.080 Executing: process_push_status	
10	auto -> 0000002508 14:17:23.351 Saving results from script: process_push_status	
10	auto -> 0000002508 14:17:23.380 Executing: process_clean_scratch	
10	auto -> 0000002508 14:17:23.920 Saving results from script: process_clean_scratch	
10	auto -> 0000002508 14:17:23.941 Executing: central_rsync	
4	auto -> 0000000555 14:17:25.800 STARTING =====	
4	auto -> 0000000555 14:17:25.821 Executing: import_serialem	
5	auto -> 0000000599 14:17:26.007 STARTING =====	
5	auto -> 0000000599 14:17:26.039 Executing: import_serialem	
6	auto -> 0000000470 14:17:26.184 STARTING =====	
6	auto -> 0000000470 14:17:26.205 Executing: import_serialem	
7	auto -> 0000000497 14:17:36.166 STARTING =====	

# FOCUS – Process Tab: The Job Queue

Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Project Library Imp

### PROCESS IMAGES

Parallel Processing

Concurrency Selection

Number of jobs to run in parallel: 14  
The maximum number of threads on your system is: 28

Processing Queue

Images in queue

- auto -> 0000002514
- auto -> 0000002513
- auto -> 0000000566
- auto -> 0000000559
- auto -> 0000000575
- auto -> 0000000600
- auto -> 0000000560
- auto -> 0000000563
- auto -> 0000000557
- auto -> 0000000558
- auto -> 0000000564
  - Import Movie from SerialEM
  - Align w/ MotionCor2
  - gCTF (on average)
  - Measure Iciness
  - Push Status data
  - Clean SCRATCH disk after Processing
  - Sync with central
- auto -> 0000000572
  - Import Movie from SerialEM
  - Align w/ MotionCor2
  - gCTF (on average)
  - Measure Iciness
  - Push Status data
  - Clean SCRATCH disk after Processing
  - Sync with central

### Current Status

Processing, 65 Images are in queue

ID	Image	Status
9	auto -> 0000002506	14:16:12.313 Saving results from script: process_push_status
9	auto -> 0000002506	14:16:12.335 Executing: process_clean_scratch
9	auto -> 0000002506	14:16:12.888 Saving results from script: process_clean_scratch
9	auto -> 0000002506	14:16:12.909 Executing: central_rsync
8	auto -> 0000002505	14:16:13.900 Saving results from script: process_push_status
8	auto -> 0000002505	14:16:13.932 Executing: process_clean_scratch
8	auto -> 0000002505	14:16:14.323 Saving results from script: process_clean_scratch
8	auto -> 0000002505	14:16:14.351 Executing: central_rsync
8	auto -> 0000002505	14:16:14.612 Saving results from script: process_push_status
8	auto -> 0000002505	14:16:14.633 Executing: process_clean_scratch
8	auto -> 0000002505	14:16:16.021 Saving results from script: process_push_status
8	auto -> 0000002505	14:16:16.042 Executing: process_clean_scratch
3	auto -> 0000002512	14:16:17.649 STARTING
3	auto -> 0000002512	14:16:17.704 Executing: process_clean_scratch
1	auto -> 0000002509	14:16:35.909 Saving results from script: process_push_status
1	auto -> 0000002509	14:16:35.947 Executing: process_clean_scratch
6	auto -> 0000002503	14:16:36.780 Saving results from script: process_push_status
6	auto -> 0000002503	14:16:36.828 FINISHED
7	auto -> 0000002504	14:16:38.166 Saving results from script: central_rsync

```

cina@bs-focus-titan: ~
Every 3.0s: nvidia-smi
Thu Mar 15 14:36:13 2018
-----
NVIDIA-SMI 375.26              Driver Version: 375.26
-----+-----
GPU   Name                   Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
 Fan  Temp  Perf  Pwr:Usage/Cap|  Memory-Usage | GPU-Util  Compute M. |
-----+-----
  0   30%   54C   P2    99W / 250W |  4394MiB / 12188MiB |   93%    Default |
  1   32%   57C   P2   100W / 250W |  3145MiB / 12189MiB |   96%    Default |
  2   34%   59C   P2   117W / 250W |  3037MiB / 12189MiB |   96%    Default |
  3   33%   57C   P2   109W / 250W |  3053MiB / 12189MiB |   97%    Default |
-----+-----

```

# FOCUS – Process Tab: The Job Queue

Project: Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Library | Process | Settings | Export

PROCESS IMAGES  
Parallel Processing  
Concurrency Selection  
Number of jobs to run in parallel: 14  
The maximum number of threads on your system is: 28

Processing Queue  
Add Images | Prioritize | Clear All | Clear Selected

Images in queue  
auto -> 0000002514  
auto -> 0000002513  
auto -> 0000000566  
auto -> 0000000559  
auto -> 0000000575  
auto -> 0000000600  
auto -> 0000000560  
auto -> 0000000563  
auto -> 0000000557  
auto -> 0000000558  
auto -> 0000000564  
Import Movie from SerialEM  
Align w/ MotionCor2  
gCTF (on average)  
Measure Ichness  
Push Status data  
Clean SCRATCH disk after Processing  
Sync with central  
auto -> 0000000572  
Import Movie from SerialEM  
Align w/ MotionCor2  
gCTF (on average)  
Measure Ichness  
Push Status data  
Clean SCRATCH disk after Processing  
Sync with central  
auto -> 0000000576  
auto -> 0000000567  
auto -> 0000000561  
auto -> 0000000781  
auto -> 0000000738  
auto -> 0000000740  
auto -> 0000000741  
auto -> 0000002453  
auto -> 0000002438  
auto -> 0000002450  
auto -> 0000000802  
auto -> 0000000831  
auto -> 0000000832  
auto -> 0000000962  
auto -> 0000000801  
auto -> 0000002448  
auto -> 0000000964  
auto -> 0000001266  
auto -> 0000002059  
auto -> 0000002060  
auto -> 0000001442  
auto -> 0000001443  
auto -> 0000001446  
auto -> 0000001520  
auto -> 0000001542  
auto -> 0000001541  
auto -> 0000001652  
auto -> 0000001636  
auto -> 0000001666  
auto -> 0000001654  
auto -> 0000001935  
auto -> 0000001867  
auto -> 0000001856  
auto -> 0000001855  
auto -> 0000001857  
auto -> 0000001899  
auto -> 0000001934  
auto -> 0000001933  
auto -> 0000002055  
auto -> 0000002061  
auto -> 0000002054  
auto -> 0000002258  
auto -> 0000002154  
auto -> 0000002152  
auto -> 0000002161  
auto -> 0000002259  
auto -> 0000002451  
auto -> 0000002480  
auto -> 0000002481  
auto -> 0000003504  
auto -> 0000002474  
auto -> 0000002477  
auto -> 0000002478

Current Status  
Processing, 65 Images are In Queue  
Stop Processing  
Automatically start processing, once there are images in queue

id	Image	Process
9	auto -> 0000002506 14:16:12.313 Saving results from script: process_push_status	
9	auto -> 0000002506 14:16:12.335 Executing: process_clean_scratch	
9	auto -> 0000002506 14:16:12.888 Saving results from script: process_clean_scratch	
9	auto -> 0000002506 14:16:12.909 Executing: central_rsync	
8	auto -> 0000002505 14:16:13.900 Saving results from script: process_ctf	
8	auto -> 0000002505 14:16:13.932 Executing: process_ichness	
8	auto -> 0000002505 14:16:14.323 Saving results from script: process_ichness	
8	auto -> 0000002505 14:16:14.351 Executing: process_push_status	
8	auto -> 0000002505 14:16:14.612 Saving results from script: process_push_status	
8	auto -> 0000002505 14:16:14.633 Executing: process_clean_scratch	
8	auto -> 0000002505 14:16:16.021 Saving results from script: process_clean_scratch	
8	auto -> 0000002505 14:16:16.042 Executing: central_rsync	
3	auto -> 0000002512 14:16:17.649 STARTING =====	
3	auto -> 0000002512 14:16:17.704 Executing: import_serialelem	
1	auto -> 0000002509 14:16:35.909 Saving results from script: import_serialelem	
1	auto -> 0000002509 14:16:35.947 Executing: import_driftcor_motioncor2	
6	auto -> 0000002503 14:16:36.780 Saving results from script: central_rsync	
6	auto -> 0000002503 14:16:36.828 FINISHED =====	
7	auto -> 0000002504 14:16:38.166 Saving results from script: central_rsync	
7	auto -> 0000002504 14:16:38.187 FINISHED =====	
2	auto -> 0000002510 14:16:40.524 Saving results from script: import_serialelem	
2	auto -> 0000002510 14:16:40.561 Executing: import_driftcor_motioncor2	
11	auto -> 0000002511 14:16:45.190 Saving results from script: import_serialelem	
11	auto -> 0000002511 14:16:45.235 Executing: import_driftcor_motioncor2	
0	auto -> 0000002507 14:17:00.170 Saving results from script: import_driftcor_motioncor2	
0	auto -> 0000002507 14:17:00.208 Executing: process_ctf	
0	auto -> 0000002507 14:17:04.910 Saving results from script: process_ctf	
0	auto -> 0000002507 14:17:04.950 Executing: process_ichness	
0	auto -> 0000002507 14:17:05.336 Saving results from script: process_ichness	
0	auto -> 0000002507 14:17:05.394 Executing: process_push_status	
0	auto -> 0000002507 14:17:05.662 Saving results from script: process_push_status	
0	auto -> 0000002507 14:17:05.715 Executing: process_clean_scratch	
0	auto -> 0000002507 14:17:06.328 Saving results from script: process_clean_scratch	
0	auto -> 0000002507 14:17:06.361 Executing: central_rsync	
10	auto -> 0000002508 14:17:17.168 Saving results from script: import_driftcor_motioncor2	
10	auto -> 0000002508 14:17:17.726 Executing: process_ctf	
10	auto -> 0000002508 14:17:22.350 Saving results from script: process_ctf	
10	auto -> 0000002508 14:17:22.389 Executing: process_ichness	
10	auto -> 0000002508 14:17:22.761 Saving results from script: process_ichness	
10	auto -> 0000002508 14:17:23.080 Executing: process_push_status	
10	auto -> 0000002508 14:17:23.351 Saving results from script: process_push_status	
10	auto -> 0000002508 14:17:23.380 Executing: process_clean_scratch	
10	auto -> 0000002508 14:17:23.920 Saving results from script: process_clean_scratch	
10	auto -> 0000002508 14:17:23.941 Executing: central_rsync	
4	auto -> 0000000555 14:17:25.800 STARTING =====	
4	auto -> 0000000555 14:17:25.821 Executing: import_serialelem	
5	auto -> 0000000599 14:17:26.007 STARTING =====	
5	auto -> 0000000599 14:17:26.039 Executing: import_serialelem	
6	auto -> 0000000470 14:17:26.184 STARTING =====	
6	auto -> 0000000470 14:17:26.205 Executing: import_serialelem	
7	auto -> 0000000497 14:17:36.144 STARTING =====	

# FOCUS – The Library

Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Project: Library Process Datasets Export

0 selected and 1 highlighted

Select	Directory	Flag	Spec Name	Spec Num	px [Å]	Defocus[um]	CTFres	Meas_Dse/frm[e/px]	Dse/frm[e/Å]	Total Dse[e/Å]	Drift[Å]	MaxDrift[Å]	Deceleration	Last Processed	Day	Time	Frames	Particles	OrStackName	
	auto																			
	0000002508		chao	147-22	1.000000	0.000	0.0	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	Mar15	14.10.35	0	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-22_Mar15_14.10.35.tif
	0000002509		chao	147-22	1.000000	0.000	0.0	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	Mar15	14.11.10	0	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-22_Mar15_14.11.10.tif
	0000002505		chao	147-22	0.831000	0.000	0.00	0.076993	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.09.49	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-22_Mar15_14.09.49.tif
	0000002505		chao	147-21	0.831000	0.000	0.00	0.907720	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.08.26	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-21_Mar15_14.08.26.tif
	0000002500		chao	147-20	0.831000	2.101	4.73	1.085133	2.257143	78.999999	13.9	0.161	0.248	0.000	0.000	Mar15	14.08.01	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-20_Mar15_14.08.01.tif
	0000002503		chao	147-21	0.831000	0.000	0.00	1.075057	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.07.40	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-21_Mar15_14.07.40.tif
	0000002502		chao	147-20	0.831000	2.115	6.17	1.007703	2.257143	78.999999	6.1	0.057	0.061	0.000	0.000	Mar15	14.06.21	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-20_Mar15_14.06.21.tif
	0000002501		chao	147-20	0.831000	2.015	5.53	0.967833	2.257143	78.999999	10.5	0.108	0.210	0.000	0.000	Mar15	14.05.56	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-20_Mar15_14.05.56.tif
	0000002499		chao	147-19	0.831000	2.096	5.53	0.953597	2.257143	78.999999	8.4	0.124	0.124	0.000	0.000	Mar15	14.04.16	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-19_Mar15_14.04.16.tif
	0000002498		chao	147-19	0.831000	2.095	4.69	0.798877	2.257143	78.999999	4.3	0.038	0.063	0.000	0.000	Mar15	14.03.51	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-19_Mar15_14.03.51.tif
	0000002497		chao	147-19	0.831000	2.096	5.92	0.949677	2.257143	78.999999	9.0	0.125	0.191	0.000	0.000	Mar15	14.03.30	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-19_Mar15_14.03.30.tif
	0000002496		chao	147-18	0.831000	2.100	5.24	1.004797	2.257143	78.999999	5.7	0.064	0.067	0.000	0.000	Mar15	13.56.53	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-18_Mar15_13.56.53.tif
	0000002495		chao	147-18	0.831000	2.081	6.13	0.982213	2.257143	78.999999	5.2	0.036	0.042	0.000	0.000	Mar15	13.56.29	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-18_Mar15_13.56.29.tif
	0000002494		chao	147-18	0.831000	2.102	5.53	0.972147	2.257143	78.999999	7.5	0.061	0.102	0.000	0.000	Mar15	13.56.08	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-18_Mar15_13.56.08.tif
	0000002493		chao	147-17	0.831000	2.119	5.96	1.019583	2.257143	78.999999	1.8	0.053	0.043	0.000	0.000	Mar15	13.54.48	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-17_Mar15_13.54.48.tif
	0000002492		chao	147-17	0.831000	2.119	5.51	1.015697	2.257143	78.999999	1.5	0.031	-0.002	0.000	0.000	Mar15	13.54.23	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-17_Mar15_13.54.23.tif
	0000002491		chao	147-17	0.831000	2.098	5.48	1.061700	2.257143	78.999999	4.5	0.048	0.088	0.000	0.000	Mar15	13.54.02	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-17_Mar15_13.54.02.tif
	0000002490		chao	147-16	0.831000	2.091	5.59	1.015047	2.257143	78.999999	1.8	0.032	0.024	0.000	0.000	Mar15	13.52.42	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-16_Mar15_13.52.42.tif
	0000002489		chao	147-16	0.831000	2.081	5.64	1.001910	2.257143	78.999999	3.2	0.033	-0.018	0.000	0.000	Mar15	13.52.18	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-16_Mar15_13.52.18.tif
	0000002488		chao	147-16	0.831000	2.082	5.72	1.039300	2.257143	78.999999	9.5	0.052	0.057	0.000	0.000	Mar15	13.51.56	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-16_Mar15_13.51.56.tif
	0000002487		chao	147-15	0.831000	2.092	5.16	1.033537	2.257143	78.999999	2.5	0.046	0.002	0.000	0.000	Mar15	13.50.71	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-15_Mar15_13.50.71.tif
	0000002486		chao	147-15	0.831000	2.060	4.17	1.025473	2.257143	78.999999	2.3	0.044	0.014	0.000	0.000	Mar15	13.50.12	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-15_Mar15_13.50.12.tif
	0000002485		chao	147-15	0.831000	2.081	5.00	1.062603	2.257143	78.999999	6.6	0.041	0.026	0.000	0.000	Mar15	13.49.50	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-15_Mar15_13.49.50.tif
	0000002484		chao	147-14	0.831000	1.976	4.10	1.058320	2.257143	78.999999	6.8	0.080	0.088	0.000	0.000	Mar15	13.48.31	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-14_Mar15_13.48.31.tif
	0000002483		chao	147-14	0.831000	1.981	5.68	1.060127	2.257143	78.999999	6.1	0.063	0.158	0.000	0.000	Mar15	13.47.44	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-14_Mar15_13.47.44.tif
	0000002482		chao	147-14	0.831000	1.938	5.24	1.089773	2.257143	78.999999	5.1	0.063	0.087	0.000	0.000	Mar15	13.47.44	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-14_Mar15_13.47.44.tif
	0000002481		chao	147-13	0.831000	1.196	16.87	0.998853	2.257143	78.999999	2.8	0.030	0.017	0.000	0.000	Mar15	13.46.21	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-13_Mar15_13.46.21.tif
	0000002480		chao	147-13	0.831000	1.162	16.87	0.978893	2.257143	78.999999	1.8	0.013	0.013	0.000	0.000	Mar15	13.45.56	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-13_Mar15_13.45.56.tif
	0000002479		chao	147-13	0.831000	1.957	3.84	1.136153	2.257143	78.999999	14.8	0.098	0.141	0.000	0.000	Mar15	13.45.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-13_Mar15_13.45.35.tif
	0000002478		chao	147-12	0.831000	4.791	17.21	0.997043	2.257143	78.999999	7.0	0.070	0.101	0.000	0.000	Mar15	13.44.13	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-12_Mar15_13.44.13.tif
	0000002477		chao	147-12	0.831000	4.162	15.00	0.961427	2.257143	78.999999	6.4	0.110	0.147	0.000	0.000	Mar15	13.43.42	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-12_Mar15_13.43.42.tif
	0000002476		chao	147-12	0.831000	1.854	4.91	1.133313	2.257143	78.999999	20.2	0.186	0.263	0.000	0.000	Mar15	13.43.26	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-12_Mar15_13.43.26.tif
	0000002475		chao	147-11	0.831000	1.878	5.60	1.044003	2.257143	78.999999	5.1	0.044	0.048	0.000	0.000	Mar15	13.42.05	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-11_Mar15_13.42.05.tif
	0000002474		chao	147-11	0.831000	1.162	16.87	1.008950	2.257143	78.999999	7.3	0.054	0.099	0.000	0.000	Mar15	13.41.40	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-11_Mar15_13.41.40.tif
	0000002473		chao	147-11	0.831000	1.852	16.87	1.128147	2.257143	78.999999	14.3	0.101	0.112	0.000	0.000	Mar15	13.41.19	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-11_Mar15_13.41.19.tif
	0000002472		chao	147-10	0.831000	1.936	5.64	1.057730	2.257143	78.999999	3.6	0.050	0.075	0.000	0.000	Mar15	13.40.00	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-10_Mar15_13.40.00.tif
	0000002471		chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	0.000	0.000	Mar15	13.39.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-10_Mar15_13.39.35.tif
	0000002470		chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	0.000	0.000	Mar15	13.39.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-10_Mar15_13.39.35.tif
	0000002469		chao	147-9	0.831000	1.924	5.37	1.053253	2.257143	78.999999	1.8	0.030	0.010	0.000	0.000	Mar15	13.37.54	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-9_Mar15_13.37.54.tif
	0000002468		chao	147-9	0.831000	1.917	5.92	1.025043	2.257143	78.999999	1.7	0.030	-0.004	0.000	0.000	Mar15	13.37.03	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-9_Mar15_13.37.03.tif
	0000002467		chao	147-9	0.831000	1.912	5.24	1.088493	2.257143	78.999999	5.0	0.058	0.032	0.000	0.000	Mar15	13.37.08	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-9_Mar15_13.37.08.tif
	0000002466		chao	147-8	0.831000	1.981	5.51	1.028000	2.257143	78.999999	2.1	0.012	0.012	0.000	0.000	Mar15	13.35.49	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-8_Mar15_13.35.49.tif
	0000002465		chao	147-8	0.831000	1.917	5.34	1.044270	2.257143	78.999999	1.5	0.035	0.034	0.000	0.000	Mar15	13.35.25	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-8_Mar15_13.35.25.tif
	0000002464		chao	147-8	0.831000	1.933	5.06	1.112833	2.257143	78.999999	5.1	0.038	-0.026	0.000	0.000	Mar15	13.35.03	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-8_Mar15_13.35.03.tif
	0000002463		chao	147-7	0.831000	1.838	5.26	1.089250	2.257143	78.999999	2.6	0.015	0.015	0.000	0.000	Mar15	13.34.45	35	0	/mnt/gatan01/users/PSI_Vladimir/raiwchao_147-7_Mar

# FOCUS – Process Tab: Manual processing of one image

The screenshot displays the FOCUS software interface. The top toolbar includes icons for Library, Images, Process (highlighted with an orange circle), Sets, and Export. The main window is titled 'Measure Iciness' and shows a 'Setup' section with an 'Image File' table:

Image Number	Comment
0000002507	-
Pixel Size on Sample Level [Angstrom]	0.831
Relative iciness of sample	1.607821
Relative iciness of sample, 2nd ice ring	0.757192

The 'Output' section shows a log of the process:

```
=====  
Initializing script environment  
=====  
--- dir_ana2 = /usr/local/cina/EMAN2/-----  
--- app_python = /usr/local/cina/EMAN2/bin/python -----  
--- app_labels = /usr/local/cina/EMAN2/bin/python -----  
--- dir_frealign = /usr/local/cina/frealign_v9.11 -----  
--- dir_relion = /usr/local/cina/reliion -----  
=====  
--- Calling label3.exe with mode 35 -----  
=====  
Relative 1st ice ring intensity: 1.607821  
Relative 2nd ice ring intensity: 0.757192  
=====  
--- process_iciness - normal end. -----  
=====
```

The 'Results' section on the right shows the following parameter values:

Parameter	Value
iciness	1.607821
iciness2	0.757192

The 'Images' section on the right lists the processed files:

- DriftCor image (2D, no DW)
- DriftCor image (FFT, no DW)
- Iciness image (FFT, MRC)

The 'File Preview' section at the bottom right shows a circular diffraction pattern with a central spot and concentric rings.

At the bottom of the interface, there is a 'DEPENDENT SCRIPTS' section with an 'initialize' button and a footer with 'Parameters | Output | History | Results'.

# FOCUS – Process Tab: Manual processing of one image

The screenshot shows the FOCUS software interface. At the top, the title bar reads "Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir". Below the title bar is a "Project" section with a gear icon. The main area is titled "PROCESS IMAGES" and contains a tab labeled "Parallel Processing" with a sub-tab "auto -> 0000002507". A vertical sidebar on the left lists processing steps: "Prepare", "Align", "Process", "Particles", and "Utility". The "Process" step is expanded to show a list of actions: "gCTF (on average)", "ctffind4.1 (on stack)", "Measure Iciness" (highlighted), "Push Status data", and "Clean SCRATCH disk after P...". The main panel displays the "Measure Iciness" setup, including an "Image File" section with a table of parameters.

Image File	
Image Number	0000002507
Comment	-
Pixel Size on Sample Level [Angstroem]	0.831
Relative iciness of sample	1.607821
Relative iciness of sample, 2nd ice ring	0.757192

# FOCUS – Process Tab: Manual processing of one image

The screenshot displays the FOCUS software interface. At the top, the title bar reads 'Focus (1-1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir'. The main window is divided into several sections:

- Top Bar:** Contains icons for 'Library', 'Process' (highlighted with an orange circle), 'Sets', and 'Export'. A 'Preferences' button is in the top right corner.
- Left Panel:** A vertical toolbar with icons for 'Project', 'Prepare', 'Process', 'Particles', and 'Utility'. Below it, a list of 'PROCESS IMAGES' includes 'gCTF (on average)', 'ctffind4.1 (on stack)', 'Measure Iciness', 'Push Status data', and 'Clean SCRATCH disk after P...'. The 'Measure Iciness' option is selected.
- Main Window:**
  - Setup:** A table with the following data:

Image Number	000002507
Comment	-
Pixel Size on Sample Level [Angstrom]	0.831
Relative iciness of sample	1.607821
Relative iciness of sample, 2nd ice ring	0.757192
  - Output (logbrowser):** A text area showing the execution log:

```
=====  
Initializing script environment  
=====  
dir_ana2 = /usr/local/cina/EMAN2  
=====  
app_python = /usr/local/cina/EMAN2/bin/python  
=====  
app_labels = /usr/local/cina/EMAN2/bin/python  
=====  
dir_realign = /usr/local/cina/realign_v9.11  
=====  
dir_reion = /usr/local/cina/reion  
=====  
Calling label3.exe with mode 35  
=====  
Relative 1st ice ring intensity: 1.607821  
Relative 2nd ice ring intensity: 0.757192  
=====  
process_iciness - normal end.  
=====
```
  - Results:** A table showing the calculated values:

Parameter	Value
iciness	1.607821
iciness2	0.757192
  - Images:** A list of generated images: 'DriftCor image (2D, no DW)', 'DriftCor image (FFT, no DW)', and 'Iciness image (FFT,MRC)'. The 'Iciness image (FFT,MRC)' is selected.
  - File Preview:** A window showing a circular FFT image with a central spot and concentric rings.
- Bottom Left:** A section for 'DEPENDENT SCRIPTS' containing an 'initialize' script.

# FOCUS – Process Tab: Manual processing of one image

The screenshot shows the FOCUS software interface. The 'Process' tab is active, and the 'Measure Iciness' workflow is selected. The 'Setup' section shows the following parameters:

Parameter	Value
Image Number	0000002507
Comment	-
Pixel Size on Sample Level (Angstrom)	0.831
Relative iciness of sample	1.607821
Relative iciness of sample, 2nd ice ring	0.757192

The 'Output' section shows the following log:

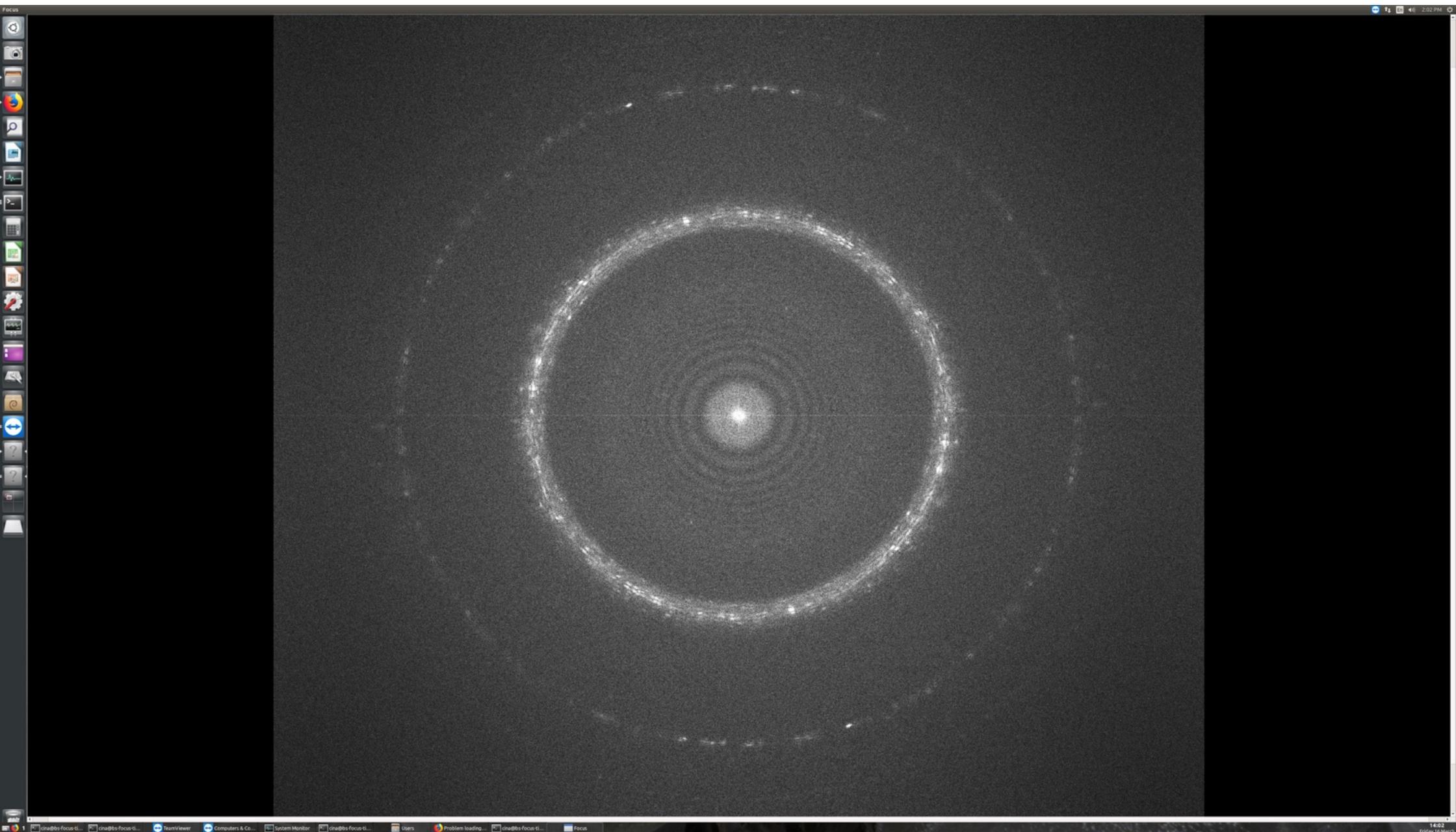
```
=====  
Initializing script environment  
=====  
dir_ana0 = /usr/local/cima/D0402/bin/python  
=====  
app_python = /usr/local/cima/D0402/bin/python  
=====  
app_ana000a = /usr/local/cima/D0402/bin/python  
=====  
dir_foreign = /usr/local/cima/foreign_v9.11  
=====  
dir_relon = /usr/local/cima/relon  
=====  
Calling label.exe with mode 35  
=====  
Relative 1st ice ring intensity: 1.607821  
Relative 2nd ice ring intensity: 0.757192  
=====  
process_iciness - normal end.  
=====
```

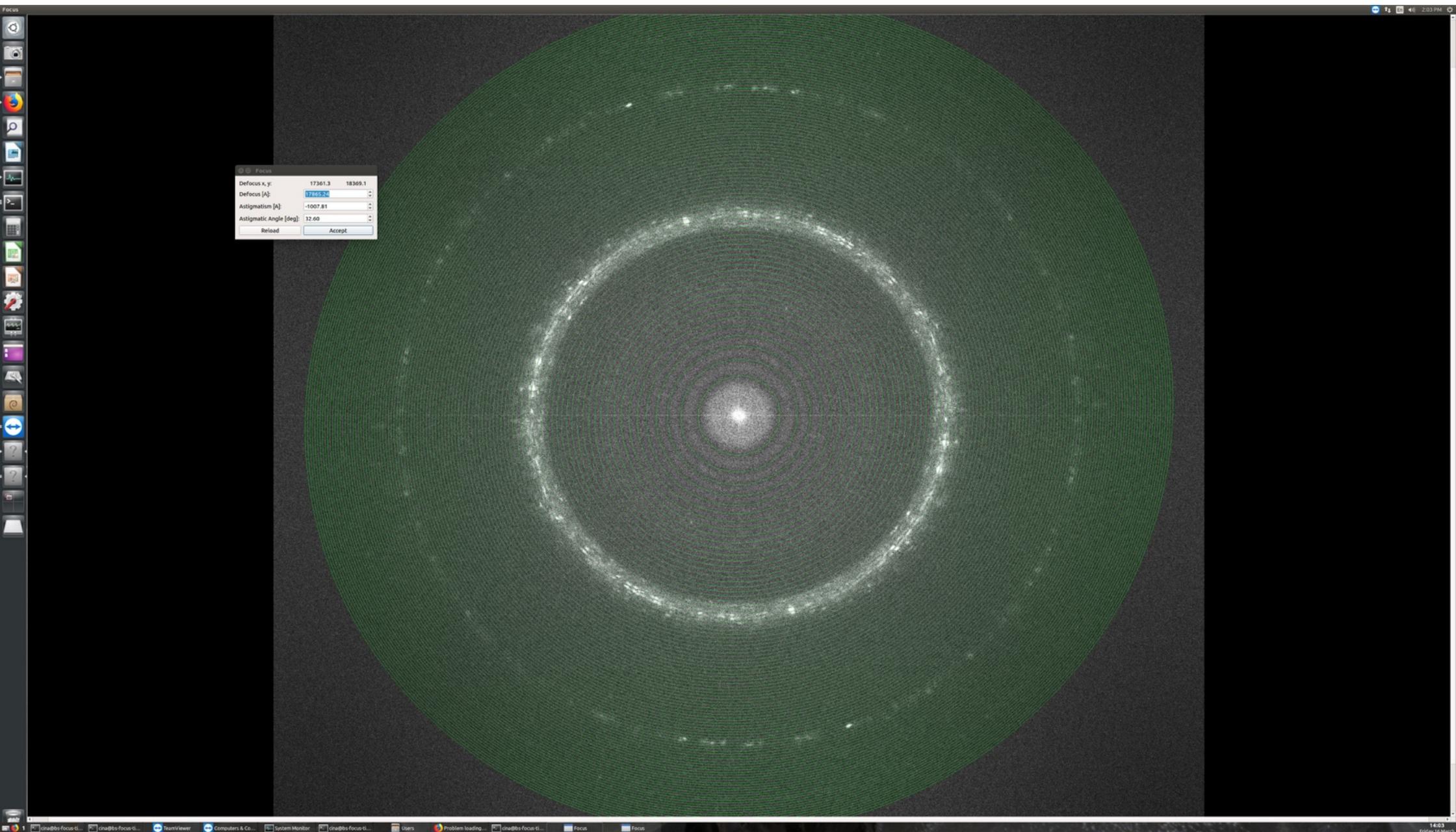
The 'Results' section shows the following parameter values:

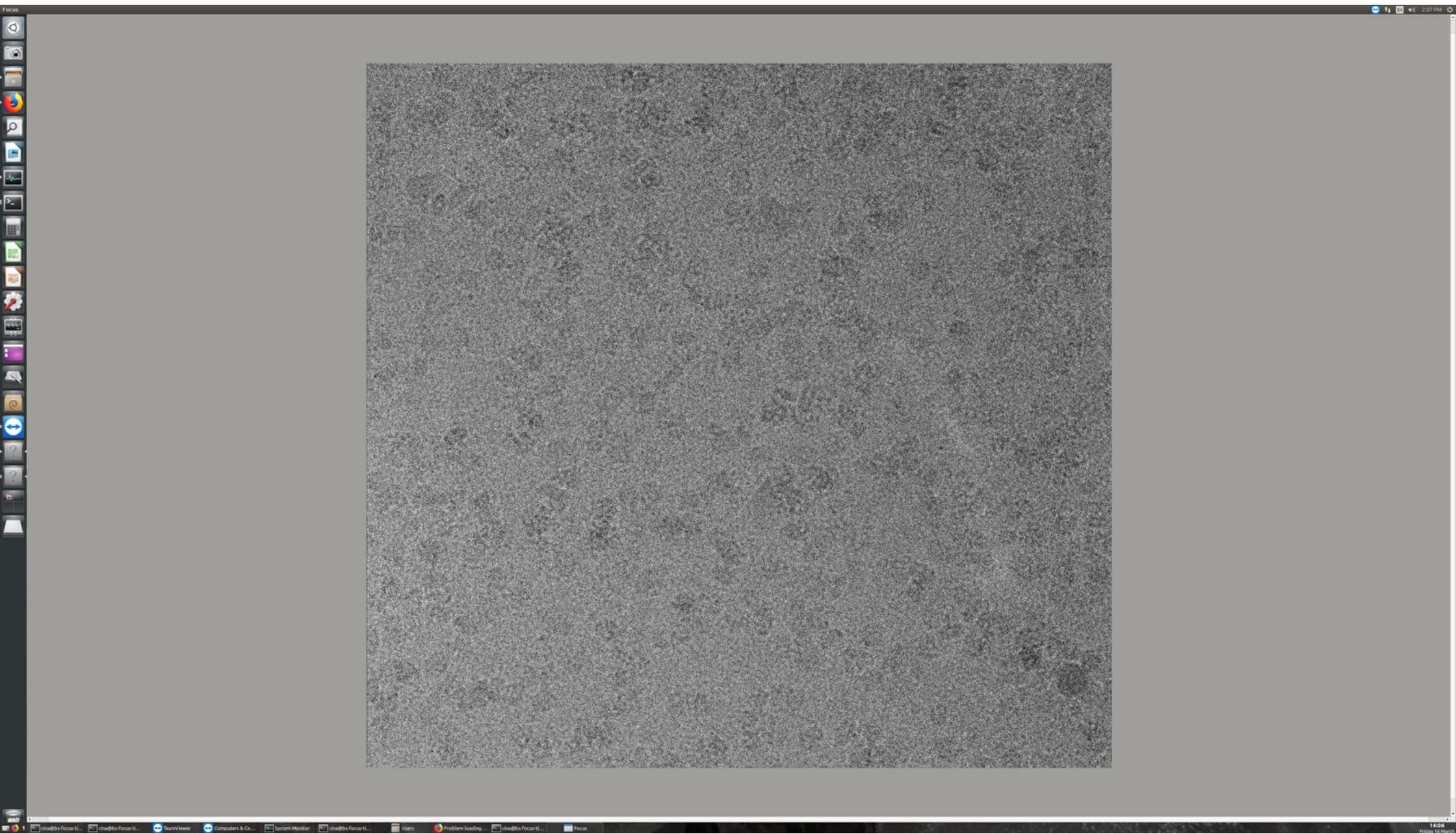
Parameter	Value
iciness	1.607821
iciness2	0.757192

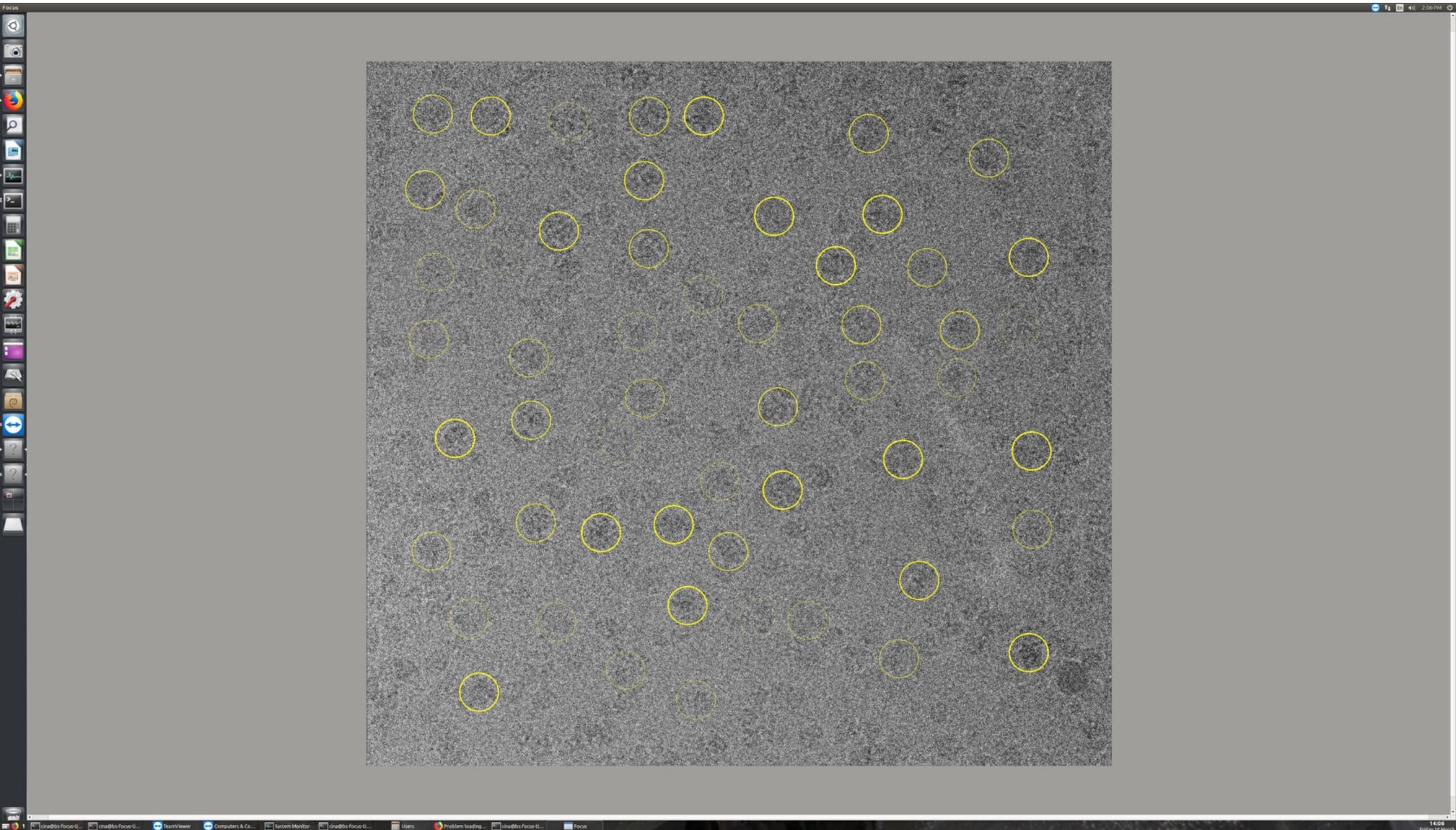
The 'File Preview' section shows a circular diffraction pattern with concentric rings.

$$\text{Iciness} = \frac{\text{Average Amplitude in } 4.0\text{\AA} \dots 3.5\text{\AA}}{\text{Average Amplitude in } 30\text{\AA} \dots 6\text{\AA}}$$









# FOCUS – The Library

Project: Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Library Process Datasets Export

0 selected and 1 highlighted

Select	Directory	Flag	Spec Name	Spec Num	px [Å]	Defocus[um]	CTFres	Meas_Dse/frm[e/px]	Dse/frm[e/Å]	Total Dse[e/Å]	Drift[Å]	MaxDrift[Å]	Deceleration	Last Processed	Day	Time	Frames	Particles	OrStackName			
	auto																					
	0000002508		chao	147-22	1.000000	0.000	0.0	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	Mar15	14.10.35	0	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-22_Mar15_14.10.35.tif		
	0000002509		chao	147-22	1.000000	0.000	0.0	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	Mar15	14.11.10	0	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-22_Mar15_14.11.10.tif		
	0000002500		chao	147-22	0.831000	0.000	0.00	0.007693	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.09.49	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-22_Mar15_14.09.49.tif		
	0000002505		chao	147-21	0.831000	0.000	0.00	0.907720	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.08.26	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-21_Mar15_14.08.26.tif		
	0000002501		chao	147-21	0.831000	0.000	0.00	0.953983	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.08.01	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-21_Mar15_14.08.01.tif		
	0000002503		chao	147-21	0.831000	0.000	0.00	1.075057	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	Mar15	14.07.40	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-21_Mar15_14.07.40.tif		
	0000002502		chao	147-20	0.831000	2.115	6.17	1.007703	2.257143	78.999999	6.1	0.057	0.061	189.459	1.558	Mar15	14.06.21	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-20_Mar15_14.06.21.tif		
	0000002501		chao	147-20	0.831000	2.015	5.53	0.967833	2.257143	78.999999	10.5	0.108	0.210	100.608	1.461	Mar15	14.05.56	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-20_Mar15_14.05.56.tif		
	0000002499		chao	147-19	0.831000	2.096	6.53	0.953597	2.257143	78.999999	8.4	0.124	0.248	114.278	1.596	Mar15	14.04.16	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-19_Mar15_14.04.16.tif		
	0000002498		chao	147-19	0.831000	2.095	4.69	0.798877	2.257143	78.999999	4.3	0.038	0.063	218.294	1.443	Mar15	14.03.51	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-19_Mar15_14.03.51.tif		
	0000002497		chao	147-19	0.831000	2.096	5.92	0.949677	2.257143	78.999999	9.0	0.125	0.191	144.656	1.491	15.03.2018	14.12	Mar15	14.03.30	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-19_Mar15_14.03.30.tif
	0000002496		chao	147-18	0.831000	2.100	0.974	1.004797	2.257143	78.999999	5.7	0.046	0.067	218.486	1.620	15.03.2018	14.05	Mar15	13.56.53	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-18_Mar15_13.56.53.tif
	0000002495		chao	147-18	0.831000	2.081	6.13	0.982213	2.257143	78.999999	5.2	0.036	0.042	173.447	1.504	15.03.2018	14.05	Mar15	13.56.29	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-18_Mar15_13.56.29.tif
	0000002494		chao	147-18	0.831000	2.102	5.53	0.967833	2.257143	78.999999	7.5	0.061	0.102	249.562	1.451	15.03.2018	14.04	Mar15	13.56.08	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-18_Mar15_13.56.08.tif
	0000002493		chao	147-17	0.831000	2.119	5.96	1.019583	2.257143	78.999999	1.8	0.053	0.043	128.078	1.586	15.03.2018	14.03	Mar15	13.54.48	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-17_Mar15_13.54.48.tif
	0000002492		chao	147-17	0.831000	2.119	5.51	1.015697	2.257143	78.999999	1.5	0.031	-0.002	385.655	1.562	15.03.2018	14.03	Mar15	13.54.23	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-17_Mar15_13.54.23.tif
	0000002491		chao	147-17	0.831000	2.098	5.48	1.061700	2.257143	78.999999	4.5	0.048	0.088	194.392	1.457	15.03.2018	14.03	Mar15	13.54.02	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-17_Mar15_13.54.02.tif
	0000002490		chao	147-16	0.831000	2.091	5.59	1.015047	2.257143	78.999999	1.8	0.032	0.024	435.309	1.601	15.03.2018	14.01	Mar15	13.52.42	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-16_Mar15_13.52.42.tif
	0000002489		chao	147-16	0.831000	2.081	5.64	1.001910	2.257143	78.999999	3.2	0.033	-0.018	329.661	1.581	15.03.2018	14.01	Mar15	13.52.18	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-16_Mar15_13.52.18.tif
	0000002488		chao	147-16	0.831000	2.082	5.72	1.013039	2.257143	78.999999	9.5	0.052	0.057	117.821	1.523	15.03.2018	14.01	Mar15	13.51.56	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-16_Mar15_13.51.56.tif
	0000002487		chao	147-15	0.831000	2.092	5.16	1.033537	2.257143	78.999999	2.5	0.046	0.062	327.471	1.649	15.03.2018	14.01	Mar15	13.52.42	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-15_Mar15_13.52.42.tif
	0000002486		chao	147-15	0.831000	2.060	4.17	1.025473	2.257143	78.999999	2.3	0.044	0.014	321.970	1.595	15.03.2018	13.59	Mar15	13.50.12	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-15_Mar15_13.50.12.tif
	0000002485		chao	147-15	0.831000	2.081	5.00	1.062603	2.257143	78.999999	6.6	0.041	0.026	237.619	1.503	15.03.2018	13.59	Mar15	13.49.50	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-15_Mar15_13.49.50.tif
	0000002484		chao	147-14	0.831000	1.976	4.10	1.058320	2.257143	78.999999	6.8	0.080	0.088	252.715	1.619	15.03.2018	13.57	Mar15	13.48.31	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-14_Mar15_13.48.31.tif
	0000002483		chao	147-14	0.831000	1.981	5.68	1.060127	2.257143	78.999999	6.1	0.063	0.104	295.371	1.589	15.03.2018	13.57	Mar15	13.47.44	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-14_Mar15_13.47.44.tif
	0000002482		chao	147-14	0.831000	1.938	5.24	1.089773	2.257143	78.999999	5.1	0.063	0.087	206.304	1.490	15.03.2018	13.57	Mar15	13.47.34	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-14_Mar15_13.47.34.tif
	0000002481		chao	147-13	0.831000	1.196	16.87	0.998853	2.257143	78.999999	2.8	0.030	0.017	311.330	1.590	15.03.2018	13.55	Mar15	13.46.21	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-13_Mar15_13.46.21.tif
	0000002480		chao	147-13	0.831000	1.162	16.87	0.998853	2.257143	78.999999	2.8	0.030	0.017	311.330	1.590	15.03.2018	13.55	Mar15	13.46.21	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-13_Mar15_13.46.21.tif
	0000002479		chao	147-13	0.831000	1.957	3.84	1.136153	2.257143	78.999999	14.8	0.098	0.141	149.003	1.395	15.03.2018	13.54	Mar15	13.45.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-13_Mar15_13.45.35.tif
	0000002478		chao	147-12	0.831000	4.791	17.21	0.997043	2.257143	78.999999	7.0	0.070	0.101	174.106	1.599	15.03.2018	13.53	Mar15	13.44.13	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-12_Mar15_13.44.13.tif
	0000002477		chao	147-12	0.831000	4.162	15.20	0.961427	2.257143	78.999999	6.4	0.110	0.143	164.534	1.624	15.03.2018	13.52	Mar15	13.43.52	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-12_Mar15_13.43.52.tif
	0000002476		chao	147-12	0.831000	1.854	4.91	1.133313	2.257143	78.999999	20.2	0.186	0.263	105.449	1.541	15.03.2018	13.53	Mar15	13.43.26	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-12_Mar15_13.43.26.tif
	0000002475		chao	147-11	0.831000	1.878	5.60	1.044003	2.257143	78.999999	5.1	0.044	0.048	274.526	1.625	15.03.2018	13.50	Mar15	13.42.05	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-11_Mar15_13.42.05.tif
	0000002474		chao	147-11	0.831000	1.162	16.87	1.008950	2.257143	78.999999	7.3	0.054	0.099	92.492	1.532	15.03.2018	13.51	Mar15	13.41.40	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-11_Mar15_13.41.40.tif
	0000002473		chao	147-11	0.831000	1.852	16.87	1.128167	2.257143	78.999999	14.3	0.041	0.012	112.120	1.501	15.03.2018	13.49	Mar15	13.41.19	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-11_Mar15_13.41.19.tif
	0000002472		chao	147-10	0.831000	1.936	5.64	1.057730	2.257143	78.999999	3.6	0.050	0.075	288.515	1.625	15.03.2018	13.49	Mar15	13.40.00	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-10_Mar15_13.40.00.tif
	0000002471		chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	314.603	1.578	15.03.2018	13.48	Mar15	13.39.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-10_Mar15_13.39.35.tif
	0000002470		chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	314.603	1.578	15.03.2018	13.48	Mar15	13.39.35	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-10_Mar15_13.39.35.tif
	0000002469		chao	147-9	0.831000	1.924	5.37	1.053253	2.257143	78.999999	1.8	0.030	0.010	371.106	1.634	15.03.2018	13.46	Mar15	13.37.54	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-9_Mar15_13.37.54.tif
	0000002468		chao	147-9	0.831000	1.917	5.92	1.025043	2.257143	78.999999	1.7	0.030	-0.004	443.156	1.617	15.03.2018	13.47	Mar15	13.37.03	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-9_Mar15_13.37.03.tif
	0000002467		chao	147-9	0.831000	1.912	5.24	1.088493	2.257143	78.999999	5.0	0.058	0.032	257.707	1.525	15.03.2018	13.46	Mar15	13.37.08	35	0	/mnt/gatan01/users/PSI_Vladimir/raiw/chao_147-9_Mar15_13.37.08.tif
	0000002466		chao	147-8	0.831000	1.981	5.51	1.028000	2.257143	78.999999	2.											

# FOCUS – The Library: Select and REPROCESS

Focus [1.3.0] | Current Project: Unnamed Project | Project Directory: /data/Users/vladimr/

Process Selected | Library | Process | Datasets | Export

69 selected and 69 highlighted

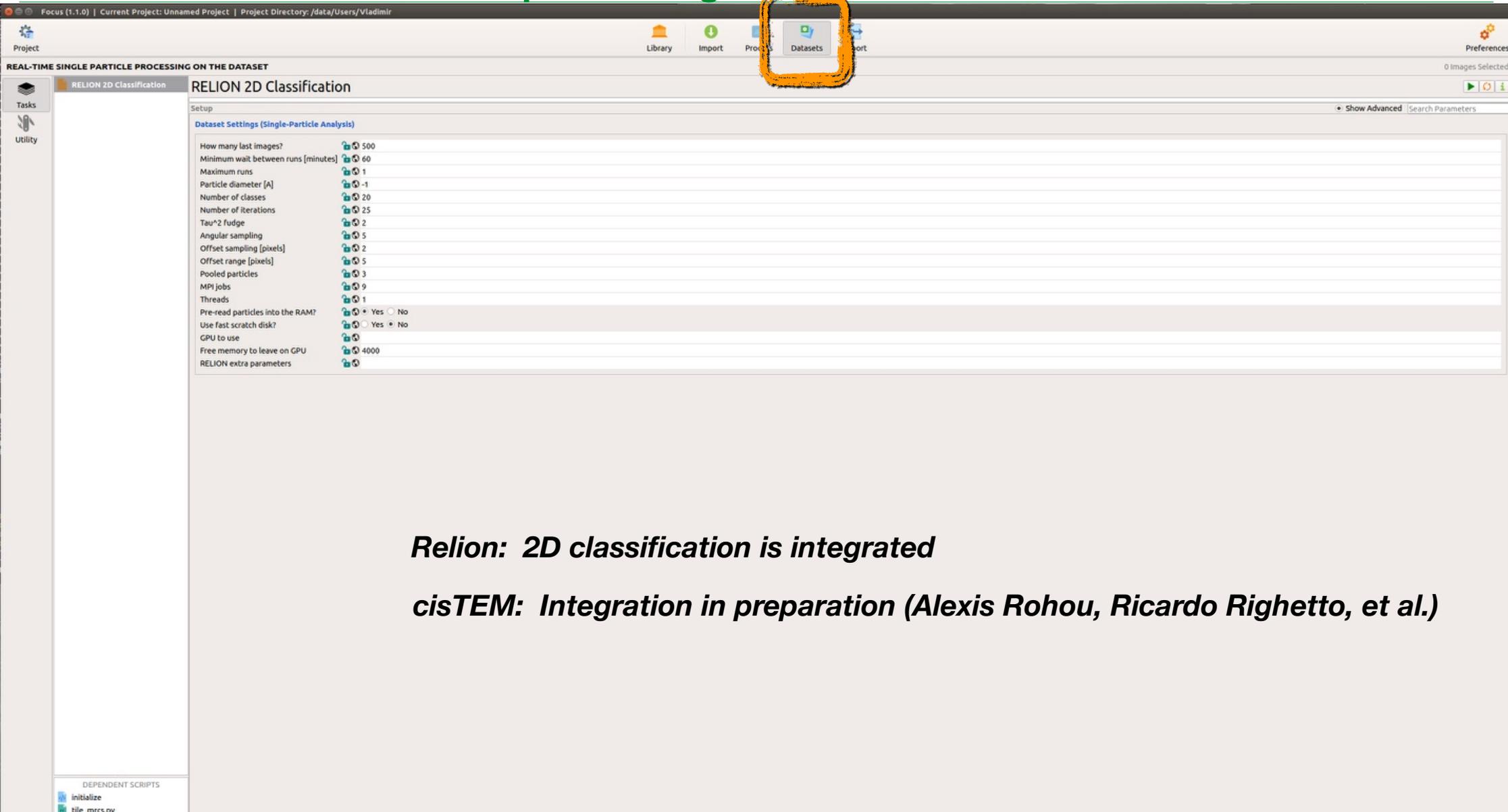
Select	Directory	File Name	Spec Num	px [Å]	Defocus[um]	CTFres	Meas_Dose[fm/px]	Dose[fm/Å²]	Total Dose[Å²]	Drift[Å]	MaxDrift[Å]	Deceleration	Last Processed	Day	Time	frames	Particles	OrtStackName	
0	chao	143-297	0.831000	0.180	200.04	1.016540	2.257143	78.999999	9.3	0.195	-0.156	479.998	0924	15.03.2018	03:09	Mar15	02:58.54	0	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-297_Mar15_02.58.54.tif
0	chao	143-28	0.831000	0.201	19.81	1.006633	2.257143	78.999999	9.2	0.176	0.112	556.865	1.062	15.03.2018	04:20	Mar15	17:30.55	0	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-28_Mar14_17.30.55.tif
0	chao	145-22	0.831000	0.261	19.81	0.855483	2.257143	78.999999	12.6	0.579	0.003	534.648	1.062	15.03.2018	04:20	Mar15	04:09.10	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-22_Mar15_04.09.10.tif
0	chao	143-54	0.831000	0.175	19.81	0.929307	2.257143	78.999999	12.9	0.417	-0.709	516.865	0.978	14.03.2018	18:34	Mar14	18:22.19	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-54_Mar14_18.22.19.tif
0	chao	145-250	0.831000	0.192	19.81	0.871609	2.257143	78.999999	14.7	0.562	0.562	471.622	1.044	15.03.2018	12:47	Mar15	12:37.31	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-250_Mar15_12.37.31.tif
0	chao	143-54	0.831000	0.211	19.81	1.008013	2.257143	78.999999	33.1	0.171	1.725	444.664	1.076	14.03.2018	18:34	Mar14	18:21.59	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-54_Mar14_18.21.59.tif
0	chao	143-297	0.831000	0.185	19.81	1.006033	2.257143	78.999999	6.4	0.164	-0.057	417.461	0.922	15.03.2018	03:11	Mar15	02:59.37	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-297_Mar15_02.59.37.tif
0	chao	145-22	0.831000	0.199	19.81	0.889130	2.257143	78.999999	28.3	0.968	0.165	401.799	1.059	15.03.2018	04:20	Mar15	04:08.49	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-22_Mar15_04.08.49.tif
0	chao	143-296	0.831000	0.192	19.58	1.029367	2.257143	78.999999	5.3	0.244	-0.199	559.165	0.932	15.03.2018	03:08	Mar15	02:57.38	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-296_Mar15_02.57.38.tif
0	chao	145-250	0.831000	0.179	19.58	0.861990	2.257143	78.999999	4.9	0.209	-0.142	487.403	0.964	15.03.2018	12:47	Mar15	12:38.16	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-250_Mar15_12.38.16.tif
0	chao	145-250	0.831000	0.208	19.58	0.863583	2.257143	78.999999	6.2	0.151	-0.096	446.511	1.056	15.03.2018	12:47	Mar15	12:37.52	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-250_Mar15_12.37.52.tif
0	chao	145-250	0.831000	0.192	19.58	0.861990	2.257143	78.999999	4.9	0.209	-0.142	487.403	0.964	15.03.2018	12:47	Mar15	12:38.16	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-250_Mar15_12.38.16.tif
0	chao	145-209	0.831000	0.462	17.56	0.800637	2.257143	78.999999	9.2	0.392	-0.245	576.704	0.934	15.03.2018	10:49	Mar15	10:37.01	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-209_Mar15_10.37.01.tif
0	chao	145-199	0.831000	0.477	17.38	0.440250	2.257143	78.999999	0.7	0.012	0.000	475.754	0.909	15.03.2018	10:31	Mar15	10:21.03	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-199_Mar15_10.21.03.tif
0	chao	143-301	0.831000	0.162	17.38	0.509367	2.257143	78.999999	7.7	0.063	0.008	328.047	1.488	15.03.2018	03:16	Mar15	03:07.14	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-301_Mar15_03.07.14.tif
0	chao	143-58	0.831000	0.202	17.21	0.923782	2.257143	78.999999	18.3	0.614	-0.359	570.162	1.018	14.03.2018	18:41	Mar14	18:30.36	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-58_Mar14_18.30.36.tif
0	chao	145-107	0.831000	0.419	17.21	0.356817	2.257143	78.999999	1.5	0.029	0.025	534.161	0.915	15.03.2018	07:17	Mar15	07:07.34	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-107_Mar15_07.07.34.tif
0	chao	143-231	0.831000	0.162	17.21	0.940213	2.257143	78.999999	2.3	0.035	-0.024	530.770	1.847	15.03.2018	00:55	Mar15	00:47.20	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-231_Mar15_00.47.20.tif
0	chao	145-199	0.831000	0.472	17.21	0.415323	2.257143	78.999999	0.3	0.012	0.007	421.859	0.930	15.03.2018	10:29	Mar15	10:21.55	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-199_Mar15_10.21.55.tif
0	chao	145-199	0.831000	0.470	17.21	0.456380	2.257143	78.999999	1.6	0.018	0.001	446.568	0.903	15.03.2018	10:30	Mar15	10:21.22	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-199_Mar15_10.21.22.tif
0	chao	145-130	0.831000	0.492	17.21	0.256882	2.257143	78.999999	0.8	0.014	-0.011	443.087	0.908	15.03.2018	08:12	Mar15	08:03.43	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-130_Mar15_08.03.43.tif
0	chao	145-130	0.831000	0.503	17.21	0.188723	2.257143	78.999999	7.3	0.012	0.014	310.407	0.865	15.03.2018	08:12	Mar15	08:03.18	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-130_Mar15_08.03.18.tif
0	chao	145-130	0.831000	0.496	17.21	0.219380	2.257143	78.999999	1.1	0.013	0.019	310.480	0.876	15.03.2018	08:12	Mar15	08:02.57	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-130_Mar15_08.02.57.tif
0	chao	147-12	0.831000	0.471	17.21	0.970743	2.257143	78.999999	7.0	0.070	0.010	174.106	1.599	15.03.2018	13:53	Mar15	13:44.13	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_147-12_Mar15_13.44.13.tif
0	chao	143-257	0.831000	0.170	17.21	0.784853	2.257143	78.999999	41.8	0.217	0.398	44.841	0.929	15.03.2018	01:48	Mar15	01:39.28	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-257_Mar15_01.39.28.tif
0	chao	145-129	0.831000	0.400	17.04	0.901125	2.257143	78.999999	0.8	0.015	0.015	320.125	0.948	15.03.2018	06:01	Mar15	05:59.11	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-129_Mar15_05.59.11.tif
0	chao	145-90	0.831000	0.474	17.04	0.343370	2.257143	78.999999	0.6	0.012	0.008	518.816	0.904	15.03.2018	06:40	Mar15	06:32.05	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-90_Mar15_06.32.05.tif
0	chao	145-64	0.831000	0.475	17.04	0.208331	2.257143	78.999999	0.7	0.011	0.000	468.400	0.869	15.03.2018	05:47	Mar15	05:37.37	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-64_Mar15_05.37.37.tif
0	chao	145-161	0.831000	0.436	17.04	0.413878	2.257143	78.999999	0.7	0.013	0.023	411.843	0.907	15.03.2018	09:21	Mar15	09:12.12	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-161_Mar15_09.12.12.tif
0	chao	145-161	0.831000	0.436	17.04	0.364280	2.257143	78.999999	1.9	0.029	0.018	403.256	0.909	15.03.2018	09:16	Mar15	09:06.20	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-161_Mar15_09.06.20.tif
0	chao	145-64	0.831000	0.500	17.04	0.189266	2.257143	78.999999	1.1	0.011	-0.001	389.431	0.861	15.03.2018	05:47	Mar15	05:37.58	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-64_Mar15_05.37.58.tif
0	chao	143-71	0.831000	0.162	17.04	0.000000	2.257143	78.999999	2.5	0.009	0.009	324.467	2.003	14.03.2018	13:54	Mar14	13:43.25	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-71_Mar14_13.43.25.tif
0	chao	143-71	0.831000	0.162	17.04	0.834467	2.257143	78.999999	1.4	0.011	0.018	284.425	1.068	14.03.2018	19:13	Mar14	19:04.33	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-71_Mar14_19.04.33.tif
0	chao	143-17	0.831000	0.475	17.04	0.908553	2.257143	78.999999	4.3	0.043	0.063	250.622	0.850	14.03.2018	17:12	Mar14	17:03.04	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-17_Mar14_17.03.04.tif
0	chao	140	0.831000	0.197	17.04	1.008713	2.257143	78.999999	6.2	0.032	-0.044	208.807	2.003	14.03.2018	16:33	Mar14	16:24.45	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_140_Mar14_16.24.45.tif
0	chao	94	0.831000	0.496	17.04	0.000000	2.257143	78.999999	7.6	0.044	0.044	141.737	1.706	14.03.2018	14:57	Mar14	14:47.16	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_94_Mar14_14.47.16.tif
0	chao	94	0.831000	0.496	17.04	0.000000	2.257143	78.999999	4.9	0.024	-0.027	141.639	0.802	14.03.2018	14:57	Mar14	14:47.16	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_94_Mar14_14.47.16.tif
0	chao	143-27	0.831000	0.471	17.04	0.896500	2.257143	78.999999	4.7	0.024	0.005	134.977	0.871	14.03.2018	17:37	Mar14	17:28.53	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-27_Mar14_17.28.53.tif
0	chao	143-27	0.831000	0.471	17.04	0.885026	2.257143	78.999999	2.0	0.007	0.007	170.501	0.869	14.03.2018	17:12	Mar14	17:02.40	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-27_Mar14_17.02.40.tif
0	chao	143-27	0.831000	0.471	17.04	0.840130	2.257143	78.999999	7.8	0.039	0.024	97.907	0.869	14.03.2018	17:12	Mar14	17:02.40	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-27_Mar14_17.02.40.tif
0	chao	94	0.831000	0.470	17.04	0.000000	2.257143	78.999999	10.2	0.039	0.008	56.80	0.800	15.03.2018	13:48	Mar15	13:46.51	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_94_Mar15_13.46.51.tif
0	chao	145-90	0.831000	0.4805	16.87	0.350880	2.257143	78.999999	0.7	0.011	0.001	566.4	0.865	15.03.2018	06:40	Mar15	06:31.19	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-90_Mar15_06.31.19.tif
0	chao	145-128	0.831000	0.425	16.87	0.000000	2.257143	78.999999	0.7	0.015	0.015	320.125	0.948	15.03.2018	06:01	Mar15	05:59.11	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_145-128_Mar15_05.59.11.tif
0	chao	143-301	0.831000	0.162	16.87	0.801240	2.257143	78.999999	3.4	0.041	0.030	429.2	0.800	15.03.2018	06:40	Mar15	03:07.38	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_143-301_Mar15_03.07.38.tif
0	chao	147-7	0.831000	0.163	16.87	1.043913	2.257143	78.999999	2.4	0.037	0.030	412.0	0.800	15.03.2018	06:40	Mar15	13:33.20	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_147-7_Mar15_13.33.20.tif
0	chao	56	0.831000	0.462	16.87	0.000000	2.257143	78.999999	1.4	0.040	0.040	379.2	0.800	15.03.2018	06:40	Mar15	13:31.05	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_56_Mar15_13.31.05.tif
0	chao	56	0.831000	0.462	16.87	0.000000	2.257143	78.999999	4.0	0.033	0.005	379.2	0.800	15.03.2018	06:40	Mar15	13:31.05	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_56_Mar15_13.31.05.tif
0	chao	56	0.831000	0.462	16.87	0.000000	2.257143	78.999999	2.7	0.025	-0.016	332.4	0.800	15.03.2018	06:40	Mar15	13:34.50	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_56_Mar15_13.34.50.tif
0	chao	51	0.831000	0.498	16.87	0.000000	2.257143	78.999999	2.8	0.025	0.025	311.1	0.800	15.03.2018	06:40	Mar15	13:31.12	35	/mnt/gatan0/users/PSI_Vladimir/raw/chao_51_Mar15_13.31.12.tif
0	chao	147-13	0.831000	0.196	16.87	0.998553</													

# FOCUS – The Library: Select and move to TRASH

The screenshot displays the FOCUS software interface. At the top, a green title bar reads "FOCUS – The Library: Select and move to TRASH". Below this, the main window shows a table of data with columns for "Directory", "Flag", "Spec Name", "Spec Num", "px [Å]", "Defocus", "CTFes", "Dse/frm/px", "Dse/frm/Åz", "Total Dse/Åz", "Drift[Å]", "MaxDrift[Å]", "Deceleration", "Last Processed", "Day", "Time", "frames", "Particles", and "OrtStackName". A yellow box highlights the "Library" icon in the top toolbar. To the right, a "Drift Overview" panel shows a "Drift profile" graph and a "Drift trajectory" graph. The bottom right corner contains a "Show Header/Info" button and a "Thon rings fit" button. The interface also includes a "Process Selected" toolbar and a "Project" window at the top left.



# FOCUS – Dataset Tab: Life processing for the entire dataset



The screenshot displays the FOCUS software interface. At the top, the title bar reads "Focus (1-1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir". The main menu includes "Library", "Import", "Process", "Datasets", and "Export". The "Datasets" tab is highlighted with an orange box. Below the menu, the interface is titled "REAL-TIME SINGLE PARTICLE PROCESSING ON THE DATASET". The left sidebar contains "Tasks" and "Utility". The main panel shows "RELION 2D Classification" with a "Setup" section for "Dataset Settings (Single-Particle Analysis)".

Parameter	Value
How many last images?	500
Minimum wait between runs [minutes]	60
Maximum runs	1
Particle diameter [Å]	-1
Number of classes	20
Number of iterations	25
Tau*2 fudge	2
Angular sampling	5
Offset sampling [pixels]	2
Offset range [pixels]	5
Pooled particles	3
MPI jobs	9
Threads	1
Pre-read particles into the RAM?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Use fast scratch disk?	<input type="radio"/> Yes <input checked="" type="radio"/> No
GPU to use	
Free memory to leave on GPU	4000
RELION extra parameters	

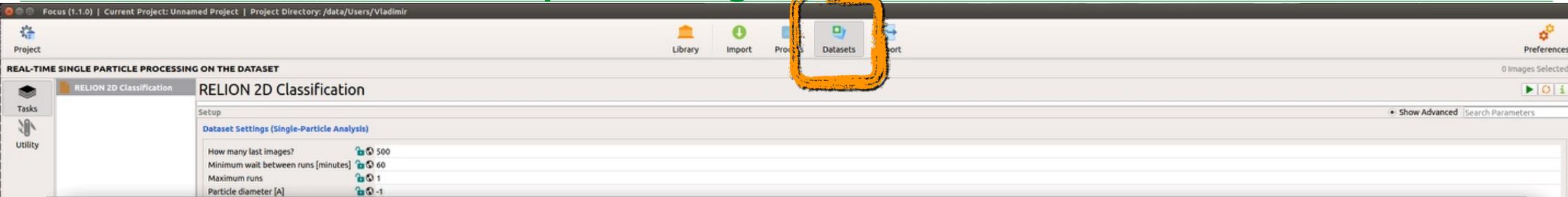
At the bottom left, under "DEPENDENT SCRIPTS", the following scripts are listed:

- initialize
- tile\_mrcs.py

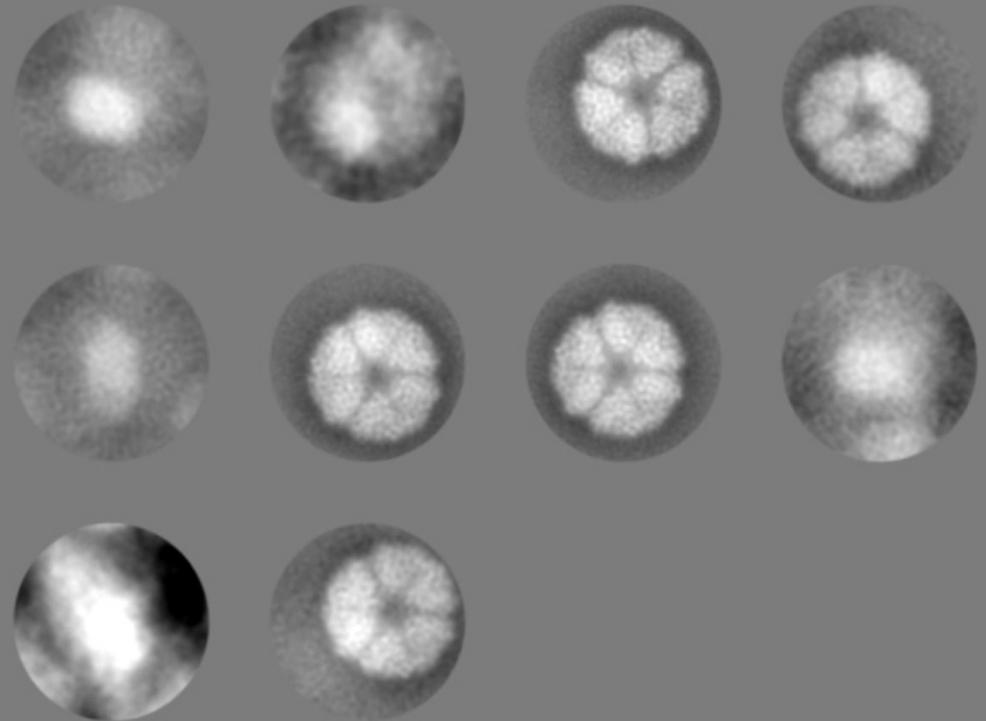
***Relion: 2D classification is integrated***

***cisTEM: Integration in preparation (Alexis Rohou, Ricardo Righetto, et al.)***

# FOCUS – Dataset Tab: Life processing for the entire dataset



- Particles auto-picked with Gautomatch
- Normalized and appended to a master .STAR file
- Runs every  $T$  minutes on the last  $M$  acquired images
- Idea: to have some diagnosis of data quality *during* data collection



## Challenges:

- Speed vs. Number of images
- Picking parameters (ptcl diameter, box size, cutoff\_cc...)

DEPENDENT SCRIPTS  
initialize  
tile\_mrcs.py

# FOCUS – Dataset Tab: Life processing for the entire dataset

The screenshot shows the FOCUS software interface. The top menu bar includes 'Project', 'Library', 'Import', 'Process', 'Datasets', and 'Export'. The 'Datasets' tab is highlighted with an orange box. Below the menu bar, the main window is titled 'RELION 2D Classification'. The left sidebar contains 'Tasks' and 'Utility' sections. The main content area shows 'Dataset Settings (Single-Particle Analysis)' with various parameters and their values:

Parameter	Value
How many last images?	500
Minimum wait between runs [minutes]	60
Maximum runs	1
Particle diameter [Å]	-1
Number of classes	20
Number of iterations	25
Tau*2 fudge	2
Angular sampling	5
Offset sampling [pixels]	2
Offset range [pixels]	5
Pooled particles	3
MPI jobs	9
Threads	1
Pre-read particles into the RAM?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Use fast scratch disk?	<input type="radio"/> Yes <input checked="" type="radio"/> No
GPU to use	
Free memory to leave on GPU	4000
RELION extra parameters	

At the bottom left, the 'DEPENDENT SCRIPTS' section lists:

- initialize
- tile\_mrcs.py

***Relion: 2D classification is integrated***

***cisTEM: Integration in preparation (Alexis Rohou, Ricardo Righetto, et al.)***

# FOCUS – Export Tab. Export good data to external resources

Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/users/Vladimir

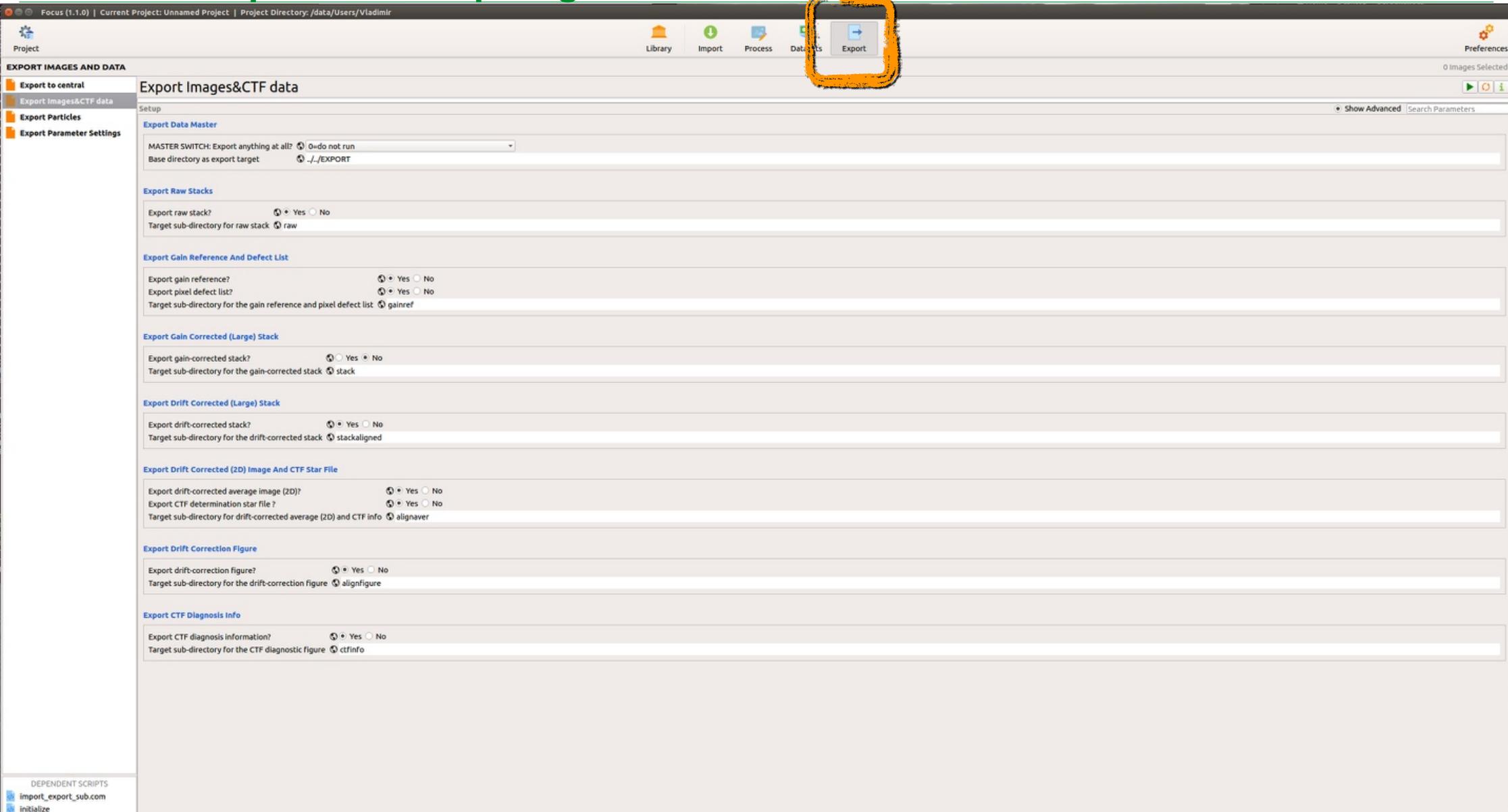
Project

Library Import Process Data Points Export

Select Directory Flag Spec Name Spec Num px [Å] Defocus[um] CTFrames Meas\_Dose/Frame[px] Dose/Frame[Az] Total Dose[Az] Drift[A] MaxDrift[A] Deceleration[A/m] Jitter Kinness Last Processed Time frames Articles OrStackName

Select	Directory	Flag	Spec Name	Spec Num	px [Å]	Defocus[um]	CTFrames	Meas_Dose/Frame[px]	Dose/Frame[Az]	Total Dose[Az]	Drift[A]	MaxDrift[A]	Deceleration[A/m]	Jitter	Kinness	Last Processed	Time	frames	Articles	OrStackName
0000002508	chao	147-22	1.000000	0.000	0.00	0.000000	0.00	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	0.000	14.10.10.0	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-22_Mar15_14.10.10.0.tif
0000002509	chao	147-22	1.000000	0.000	0.00	0.000000	0.00	0.000000	0.000000	0.000000	0.0	0.000	0.000	0.000	0.000	0.000	14.10.10.0	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-22_Mar15_14.10.10.0.tif
0000002500	chao	147-22	0.831000	0.000	0.00	0.076993	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.09.49.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-22_Mar15_14.09.49.35.tif
0000002505	chao	147-22	0.831000	0.000	0.00	0.907720	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.08.26.10	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-22_Mar15_14.08.26.10.tif
0000002503	chao	147-21	0.831000	0.000	0.00	1.075507	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.07.40.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-21_Mar15_14.07.40.35.tif
0000002502	chao	147-20	0.831000	2.115	6.17	1.007703	2.257143	78.999999	6.1	0.057	0.061	189.459	1.558	0.000	0.000	0.000	14.06.21.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-20_Mar15_14.06.21.35.tif
0000002501	chao	147-20	0.831000	2.015	5.53	0.967833	2.257143	78.999999	10.5	0.108	0.210	100.608	1.461	0.000	0.000	0.000	14.05.56.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-20_Mar15_14.05.56.35.tif
0000002499	chao	147-19	0.831000	2.096	6.53	0.953983	2.257143	78.999999	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.05.35.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-20_Mar15_14.05.35.35.tif
0000002498	chao	147-19	0.831000	2.096	4.69	0.798877	2.257143	78.999999	8.4	0.124	0.124	216.278	1.596	0.000	0.000	0.000	14.04.16.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-19_Mar15_14.04.16.35.tif
0000002497	chao	147-19	0.831000	2.096	5.92	0.949677	2.257143	78.999999	9.0	0.125	0.191	144.656	1.491	0.000	0.000	0.000	14.03.31.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-19_Mar15_14.03.31.35.tif
0000002496	chao	147-18	0.831000	2.100	5.24	1.004797	2.257143	78.999999	5.7	0.034	0.068	218.846	1.620	0.000	0.000	0.000	13.56.53.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-18_Mar15_13.56.53.35.tif
0000002495	chao	147-18	0.831000	2.081	6.13	0.982213	2.257143	78.999999	5.2	0.036	0.042	173.447	1.504	0.000	0.000	0.000	13.56.29.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-18_Mar15_13.56.29.35.tif
0000002494	chao	147-18	0.831000	2.119	5.33	0.972727	2.257143	78.999999	7.5	0.061	0.061	246.524	1.604	0.000	0.000	0.000	13.54.18.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-18_Mar15_13.54.18.35.tif
0000002493	chao	147-18	0.831000	2.119	5.96	1.019583	2.257143	78.999999	1.8	0.053	0.043	128.078	1.586	0.000	0.000	0.000	13.54.48.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-18_Mar15_13.54.48.35.tif
0000002492	chao	147-17	0.831000	2.119	5.51	1.015697	2.257143	78.999999	1.5	0.031	-0.002	385.655	1.562	0.000	0.000	0.000	13.54.23.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-17_Mar15_13.54.23.35.tif
0000002491	chao	147-17	0.831000	2.098	5.48	1.061700	2.257143	78.999999	4.5	0.048	0.088	194.392	1.457	0.000	0.000	0.000	13.54.02.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-17_Mar15_13.54.02.35.tif
0000002490	chao	147-16	0.831000	2.091	5.59	1.015047	2.257143	78.999999	1.8	0.032	0.024	435.309	1.607	0.000	0.000	0.000	13.52.42.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-16_Mar15_13.52.42.35.tif
0000002489	chao	147-16	0.831000	2.081	5.64	1.001910	2.257143	78.999999	3.2	0.033	-0.018	329.661	1.581	0.000	0.000	0.000	13.52.18.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-16_Mar15_13.52.18.35.tif
0000002488	chao	147-16	0.831000	2.082	5.72	1.039300	2.257143	78.999999	9.5	0.052	0.057	117.821	1.523	0.000	0.000	0.000	13.51.56.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-16_Mar15_13.51.56.35.tif
0000002487	chao	147-15	0.831000	2.092	5.16	1.033537	2.257143	78.999999	2.5	0.046	0.002	323.471	1.643	0.000	0.000	0.000	13.50.37.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-15_Mar15_13.50.37.35.tif
0000002486	chao	147-15	0.831000	2.060	4.17	1.025473	2.257143	78.999999	2.3	0.044	0.014	321.970	1.595	0.000	0.000	0.000	13.50.12.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-15_Mar15_13.50.12.35.tif
0000002485	chao	147-15	0.831000	2.081	5.00	1.062603	2.257143	78.999999	6.6	0.041	0.026	237.679	1.503	0.000	0.000	0.000	13.49.50.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-15_Mar15_13.49.50.35.tif
0000002484	chao	147-14	0.831000	1.976	4.10	1.058320	2.257143	78.999999	6.8	0.080	0.088	252.715	1.619	0.000	0.000	0.000	13.48.31.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-14_Mar15_13.48.31.35.tif
0000002483	chao	147-14	0.831000	1.981	5.68	1.060127	2.257143	78.999999	5.1	0.063	0.158	323.471	1.589	0.000	0.000	0.000	13.48.05.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-14_Mar15_13.48.05.35.tif
0000002482	chao	147-14	0.831000	1.938	5.24	1.089773	2.257143	78.999999	5.1	0.063	0.087	260.304	1.490	0.000	0.000	0.000	13.47.44.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-14_Mar15_13.47.44.35.tif
0000002481	chao	147-13	0.831000	1.196	16.87	0.998853	2.257143	78.999999	2.8	0.030	0.017	311.130	1.590	0.000	0.000	0.000	13.46.21.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-13_Mar15_13.46.21.35.tif
0000002480	chao	147-13	0.831000	1.162	16.87	0.978893	2.257143	78.999999	1.8	0.013	0.013	329.013	1.623	0.000	0.000	0.000	13.45.56.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-13_Mar15_13.45.56.35.tif
0000002479	chao	147-13	0.831000	1.957	3.84	1.136153	2.257143	78.999999	14.8	0.098	0.141	149.003	1.395	0.000	0.000	0.000	13.45.35.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-13_Mar15_13.45.35.35.tif
0000002478	chao	147-12	0.831000	4.791	17.21	0.997043	2.257143	78.999999	7.0	0.070	0.101	174.106	1.599	0.000	0.000	0.000	13.44.13.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-12_Mar15_13.44.13.35.tif
0000002477	chao	147-12	0.831000	4.162	15.20	0.961237	2.257143	78.999999	4.1	0.044	0.044	64.524	1.564	0.000	0.000	0.000	13.43.22.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-12_Mar15_13.43.22.35.tif
0000002476	chao	147-12	0.831000	1.854	4.91	1.133313	2.257143	78.999999	20.2	0.186	0.263	105.449	1.541	0.000	0.000	0.000	13.43.26.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-12_Mar15_13.43.26.35.tif
0000002475	chao	147-11	0.831000	1.878	5.60	1.044003	2.257143	78.999999	5.1	0.044	0.048	274.526	1.625	0.000	0.000	0.000	13.42.05.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-11_Mar15_13.42.05.35.tif
0000002474	chao	147-11	0.831000	1.878	16.87	1.008950	2.257143	78.999999	7.3	0.054	0.049	92.492	1.532	0.000	0.000	0.000	13.41.40.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-11_Mar15_13.41.40.35.tif
0000002473	chao	147-11	0.831000	1.878	16.87	1.021479	2.257143	78.999999	14.3	0.119	0.119	112.078	1.509	0.000	0.000	0.000	13.40.11.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-11_Mar15_13.40.11.35.tif
0000002472	chao	147-10	0.831000	1.936	5.64	1.057730	2.257143	78.999999	3.6	0.050	0.075	288.515	1.625	0.000	0.000	0.000	13.40.00.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-10_Mar15_13.40.00.35.tif
0000002471	chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	314.603	1.578	0.000	0.000	0.000	13.39.35.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-10_Mar15_13.39.35.35.tif
0000002470	chao	147-10	0.831000	1.909	5.96	1.041760	2.257143	78.999999	2.9	0.038	0.049	314.603	1.578	0.000	0.000	0.000	13.39.35.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-10_Mar15_13.39.35.35.tif
0000002469	chao	147-9	0.831000	1.924	5.37	1.053253	2.257143	78.999999	1.8	0.030	0.010	371.106	1.634	0.000	0.000	0.000	13.37.54.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-9_Mar15_13.37.54.35.tif
0000002468	chao	147-9	0.831000	1.917	5.92	1.025043	2.257143	78.999999	1.7	0.030	-0.004	443.156	1.617	0.000	0.000	0.000	13.37.30.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-9_Mar15_13.37.30.35.tif
0000002467	chao	147-9	0.831000	1.912	5.24	1.088493	2.257143	78.999999	5.0	0.058	0.032	257.707	1.525	0.000	0.000	0.000	13.37.08.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-9_Mar15_13.37.08.35.tif
0000002466	chao	147-8	0.831000	1.981	5.51	1.028000	2.257143	78.999999	2.1	0.045	0.042	348.713	1.628	0.000	0.000	0.000	13.35.49.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-8_Mar15_13.35.49.35.tif
0000002465	chao	147-8	0.831000	1.917	5.34	1.042470	2.257143	78.999999	1.5	0.035	0.034	418.417	1.625	0.000	0.000	0.000	13.35.25.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-8_Mar15_13.35.25.35.tif
0000002464	chao	147-8	0.831000	1.933	5.06	1.112833	2.257143	78.999999	5.1	0.038	-0.026	306.815	1.495	0.000	0.000	0.000	13.35.03.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-8_Mar15_13.35.03.35.tif
0000002463	chao	147-7	0.831000	1.878	16.87	1.028000	2.257143	78.999999	2.6	0.038	0.038	348.713	1.628	0.000	0.000	0.000	13.34.45.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-8_Mar15_13.34.45.35.tif
0000002462	chao	147-7	0.831000	1.868	16.87	1.043913	2.257143	78.999999	2.4	0.037	0.030	412.030	1.621	0.000	0.000	0.000	13.33.20.35	0	0	/mnt/gatan01/users/PSI_Vladimir/rawchao_147-7_Mar15_13.33.20.35.tif
0000002461	chao	147-7	0.831000	1.844	5.06	1.114210	2.257143	78.999999	3.4	0.046	0.007	318.568	1.493	0.000	0.000	0.000	13.32.59.35			

# FOCUS – Export Tab: Export good data to external resources



Project | Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Library Import Process Data Sets **Export** Preferences

EXPORT IMAGES AND DATA

- Export to central
- Export Images&CTF data
- Export Particles
- Export Parameter Settings

## Export Images&CTF data

Setup Show Advanced Search Parameters

### Export Data Master

MASTER SWITCH: Export anything at all?  0=do not run

Base directory as export target

### Export Raw Stacks

Export raw stack?  Yes  No

Target sub-directory for raw stack

### Export Gain Reference And Defect List

Export gain reference?  Yes  No

Export pixel defect list?  Yes  No

Target sub-directory for the gain reference and pixel defect list

### Export Gain Corrected (Large) Stack

Export gain-corrected stack?  Yes  No

Target sub-directory for the gain-corrected stack

### Export Drift Corrected (Large) Stack

Export drift-corrected stack?  Yes  No

Target sub-directory for the drift-corrected stack

### Export Drift Corrected (2D) Image And CTF Star File

Export drift-corrected average image (2D)?  Yes  No

Export CTF determination star file?  Yes  No

Target sub-directory for drift-corrected average (2D) and CTF info

### Export Drift Correction Figure

Export drift-correction figure?  Yes  No

Target sub-directory for the drift-correction figure

### Export CTF Diagnosis Info

Export CTF diagnosis information?  Yes  No

Target sub-directory for the CTF diagnostic figure

DEPENDENT SCRIPTS

- import\_export\_sub.com
- initialize

# FOCUS – Export Tab: Export good data to external resources

Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Project Library Import

## EXPORT IMAGES AND DATA

- Export to central
- Export Images&CTF data**
- Export Particles
- Export Parameter Settings

### Export Images&CTF data

Setup

#### Export Data Master

MASTER SWITCH: Export anything at all?  0=do not run

Base directory as export target  ../EXPORT

#### Export Raw Stacks

Export raw stack?  Yes  No

Target sub-directory for raw stack  raw

#### Export Gain Reference And Defect List

Export gain reference?  Yes  No

Export pixel defect list?  Yes  No

Target sub-directory for the gain reference and pixel defect list  gainref

#### Export Gain Corrected (Large) Stack

Export gain-corrected stack?  Yes  No

Target sub-directory for the gain-corrected stack  stack

# FOCUS – Export Tab: Export good data to external resources

Project | Focus (1.1.0) | Current Project: Unnamed Project | Project Directory: /data/Users/Vladimir

Library Import Process Data Sets **Export** Preferences

EXPORT IMAGES AND DATA

Export to central  
Export Images&CTF data  
Export Particles  
Export Parameter Settings

## Export Images&CTF data

Setup Show Advanced Search Parameters

### Export Data Master

MASTER SWITCH: Export anything at all?  0=do not run  
Base directory as export target

### Export Raw Stacks

Export raw stack?  Yes  No  
Target sub-directory for raw stack

### Export Gain Reference And Defect List

Export gain reference?  Yes  No  
Export pixel defect list?  Yes  No  
Target sub-directory for the gain reference and pixel defect list

### Export Gain Corrected (Large) Stack

Export gain-corrected stack?  Yes  No  
Target sub-directory for the gain-corrected stack

### Export Drift Corrected (Large) Stack

Export drift-corrected stack?  Yes  No  
Target sub-directory for the drift-corrected stack

### Export Drift Corrected (2D) Image And CTF Star File

Export drift-corrected average image (2D)?  Yes  No  
Export CTF determination star file?  Yes  No  
Target sub-directory for drift-corrected average (2D) and CTF info

### Export Drift Correction Figure

Export drift-correction figure?  Yes  No  
Target sub-directory for the drift-correction figure

### Export CTF Diagnosis Info

Export CTF diagnosis information?  Yes  No  
Target sub-directory for the CTF diagnostic figure

DEPENDENT SCRIPTS  
import\_export\_sub.com  
initialize

## FOCUS – Typical Workflow: Single Particle

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- **Import from SerialEM:** K2 movies, 8k x 8k, 50 frames, 90/hour, TIFF LZV compressed.
- **Unpack, MotionCor2 on 8k movies.**
  - MotionCor2 Fourier-crops to 4k after drift correction.
  - Create THREE dose-weighted averages: 1) DW. 2) non-DW. 3) DW only 40e/A<sup>2</sup>.
- **CTFFIND4 / gCTF**
- **Measure Iciness**
- **gAUTOMATCH** to pick particles
- **Push statistics to STATUS** website server
- **Cleanup** to delete temporary files
- **Synchronize to FOCUS-CENTRAL**

***•In parallel:  
Compute 2D class averages  
of particles of last 500 movies***

## FOCUS – Typical Workflow: 2D crystals

---

- **Import from SerialEM:** K2 movies, 8k x 8k, 80 frames, TIFF LZV compressed.
- **Unpack, MotionCor2 on 8k movies.**
  - MotionCor2 Fourier-crops to 4k after drift correction.
  - Create THREE dose-weighted averages: 1) DW. 2) non-DW. 3) DW only 40e/A<sup>2</sup>.
- **CTFFIND4 / gCTF**
- **Measure Iciness**
- **Full 2D crystal processing:** Lattice finding, Unbending, ...
- **Push statistics to STATUS** website server
- **Cleanup** to delete temporary files
- **Synchronize to FOCUS-CENTRAL**

***•In parallel:  
3D merging into 3D  
reconstruction***

## FOCUS – Typical Workflow: Electron Tomography

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- **Import from SerialEM:** K2 movies, 8k x 8k, 7 frames, TIFF LZV compressed.
- Assign Movies to Tilt Series. Learn tilt angle from file name.
- **Unpack, MotionCor2 on 8k movies.**
  - MotionCor2 Fourier-crops to 4k after drift correction.
  - Take PRIOR DOSE into account.
  - Create dose-weighted averages.
- **CTFFIND4 / gCTF**
- **Measure Iciness**
- **Push statistics to STATUS** website server
- **Cleanup** to delete temporary files
- **Synchronize to FOCUS-CENTRAL**

### ***Export function:***

- ***Re-order by tilt angle***
- ***merge into one MRC Stack per tilt series.***

# FOCUS – Typical Workflow: Electron Tomography

Focus (1.1.0) | Current Project: flagella | Project Directory: /data/Users/Thorsten/105kx\_flagella

Project: Library Import Process Export Preferences

Process Selected: Auto Selection Tool

533 selected and 1 highlight

Select	Directory	Flag	Spec Num	File Number	Defocus[um]	CTFres	Prior Dose[A2]	Counts/firm[e/px]	Dose/firm[e/px]	Dose/firm[A2]	Total Dose[A2]	Drift[A]	MaxDrift[A]	Deceleration[A/fm]	Jitter	TLTANG	frames	Last Processed	Day	Time
000003720	flagella_6	6	249	-0.065	3.03	0.000000	0.175153	0.210183	0.471025	1.413075	1.4	0.114	-0.381	451.711	0.00	3	13.10.2017 15:15	Oct11	01.0	
000003721		6	250	1.696	11.86	1.413080	0.178230	0.213876	0.437900	1.437900	0.9	0.074	-0.273	468.232	3.00	3	13.10.2017 15:16	Oct11	01.1	
000003722		6	251	1.901	10.32	2.850980	0.182491	0.218989	0.490758	1.472274	2.0	0.112	-1.322	202.877	-3.00	3	13.10.2017 15:16	Oct11	01.1	
000003723		6	252	0.116	inf	4.323250	0.171587	0.205904	0.461435	1.384305	0.8	0.083	1.490	486.272	-6.00	3	13.10.2017 15:17	Oct11	01.1	
000003724		6	253	0.591	4.72	5.707550	0.187139	0.224566	0.503257	1.509771	0.8	0.083	3.972	486.147	6.00	3	13.10.2017 15:18	Oct11	01.1	
000003725		6	254	-0.480	5.83	7.217320	0.177450	0.212940	0.477203	1.431609	0.9	0.091	-8.249	498.508	9.00	3	13.10.2017 15:19	Oct11	01.1	
000003726		6	255	0.472	6.97	8.648930	0.176234	0.211480	0.473931	1.421793	0.6	0.035	-9.921	196.118	-9.00	3	13.10.2017 15:19	Oct11	01.1	
000003727		6	256	0.117	inf	10.070700	0.180618	0.216741	0.485721	1.457163	0.8	0.077	-2.345	450.846	-12.00	3	13.10.2017 15:20	Oct11	01.1	
000003728		6	257	0.843	8.75	11.527900	0.174600	0.209520	0.469538	1.408814	1.6	0.157	-10.180	436.684	12.00	3	13.10.2017 15:21	Oct11	01.2	
000003729		6	258	0.117	inf	12.936500	0.179003	0.214803	0.481378	1.444134	1.0	0.100	-5.027	495.181	15.00	3	13.10.2017 15:21	Oct11	01.2	
000003730		6	259	0.230	6.43	14.380600	0.172790	0.207348	0.464672	1.394016	0.8	0.079	2.938	498.738	-15.00	3	13.10.2017 15:22	Oct11	01.2	
000003731		6	260	0.118	inf	15.774600	0.177366	0.212839	0.476977	1.430931	1.8	0.111	1.551	305.304	-18.00	3	13.10.2017 15:22	Oct11	01.2	
000003732		6	261	0.388	7.67	17.205500	0.173421	0.208105	0.466368	1.399104	2.1	0.155	-1.214	412.773	18.00	3	13.10.2017 15:24	Oct11	01.2	
000003738		6	262	-0.129	5.72	18.604600	0.157511	0.189013	0.423582	1.270746	2.2	0.222	12.551	487.435	21.00	3	13.10.2017 15:25	Oct11	01.2	
000003739		6	263	0.292	5.69	19.875300	0.179326	0.215191	0.482248	1.446744	1.4	0.082	1.682	187.222	-21.00	3	13.10.2017 15:26	Oct11	01.2	
000003735		6	264	0.116	inf	21.322000	0.164042	0.192482	0.431356	1.294068	0.7	0.046	-1.065	253.220	-24.00	3	13.10.2017 15:27	Oct11	01.2	
000003736		6	265	1.936	15.43	22.616100	0.164906	0.197887	0.443470	1.330410	3.0	0.193	-8.298	181.322	24.00	3	13.10.2017 15:28	Oct11	01.3	
000003737		6	266	-0.102	5.46	23.946500	0.164041	0.199681	0.447489	1.342467	1.6	0.153	-5.122	478.769	27.00	3	13.10.2017 15:29	Oct11	01.3	
000003743		6	267	0.814	7.71	25.289900	0.170034	0.204040	0.457258	1.371774	0.7	0.063	2.906	466.646	-27.00	3	13.10.2017 15:30	Oct11	01.3	
000003739		6	268	1.402	10.18	26.660800	0.186018	0.216081	0.476871	1.520613	0.7	0.058	3.799	355.827	-30.00	3	13.10.2017 15:30	Oct11	01.3	
000003740		6	269	-0.024	inf	27.911400	0.165248	0.198297	0.444387	1.333161	1.5	0.112	5.971	276.311	30.00	3	13.10.2017 15:31	Oct11	01.3	
000003741		6	270	-0.077	5.26	29.244600	0.196677	0.244057	0.532271	1.322271	2.3	0.181	11.766	331.289	33.00	3	13.10.2017 15:32	Oct11	01.3	
000003742		6	271	1.022	9.26	30.566900	0.177977	0.213572	0.478619	1.435857	1.4	0.126	-8.121	419.528	-33.00	3	13.10.2017 15:32	Oct11	01.3	
000003743		6	272	0.678	7.07	32.002800	0.159155	0.190986	0.428004	1.284012	2.2	0.221	-15.404	499.376	-36.00	3	13.10.2017 15:33	Oct11	01.4	
000003744		6	273	-0.087	5.56	33.286800	0.167327	0.200792	0.444939	1.349937	2.2	0.194	6.935	464.955	36.00	3	13.10.2017 15:34	Oct11	01.4	
000003745		6	274	-0.160	6.32	34.636700	0.157082	0.188498	0.422428	1.267284	2.9	0.289	-16.923	490.431	39.00	3	13.10.2017 15:34	Oct11	01.4	
000003746		6	275	0.951	8.25	35.904000	0.175856	0.211027	0.472916	1.418748	1.0	0.067	-1.791	290.673	-39.00	3	13.10.2017 15:35	Oct11	01.4	
000003747		6	276	0.648	7.36	37.322700	0.173388	0.388565	0.516595	1.635695	3.9	0.375	5.431	498.464	-42.00	3	13.10.2017 15:36	Oct11	01.4	
000003748		6	277	2.107	13.04	38.488400	0.155514	0.186616	0.418211	1.254633	2.5	0.246	16.290	443.720	42.00	3	13.10.2017 15:36	Oct11	01.4	
000003749		6	278	-0.122	5.81	39.743000	0.143665	0.387154	1.161462	3.87154	2.8	0.238	7.482	414.527	45.00	3	13.10.2017 15:37	Oct11	01.4	
000003750		6	279	0.582	4.20	40.904500	0.156294	0.187552	0.420308	1.260924	2.3	0.214	15.031	445.549	-45.00	3	13.10.2017 15:37	Oct11	01.5	
000003751		6	280	0.686	5.76	42.165400	0.164154	0.348782	1.103616	1.51500	1.5	0.150	11.941	499.382	-48.00	3	13.10.2017 15:38	Oct11	01.5	
000003752		6	281	0.777	10.40	43.269000	0.140930	0.378992	1.136972	3.01204	6.3	0.204	-4.398	309.685	48.00	3	13.10.2017 15:39	Oct11	01.5	
000003753		6	282	1.514	10.95	44.406000	0.130850	0.157020	0.351884	1.055652	6.3	0.633	46.152	460.050	51.00	3	13.10.2017 15:39	Oct11	01.5	
000003754		6	283	0.483	6.40	45.461700	0.143665	0.384733	1.154199	3.384733	4.3	0.265	12.747	222.572	-51.00	3	13.10.2017 15:40	Oct11	01.5	
000003755		6	284	1.696	11.76	46.615900	0.138341	0.166009	0.372029	1.116087	3.3	0.138	-4.097	96.982	-54.00	3	13.10.2017 15:41	Oct11	01.5	
000003756		6	285	1.332	13.54	47.732000	0.162123	0.363321	1.089963	3.2	0.231	7.796	351.831	54.00	3	13.10.2017 15:41	Oct11	01.5		
000003757		6	286	1.583	11.21	48.822000	0.131275	0.353028	1.059084	4.2	0.418	4.476	499.664	57.00	3	13.10.2017 15:42	Oct11	02.0		
000003758		6	287	1.906	8.44	49.881100	0.142783	0.383974	1.151922	2.7	0.252	-23.418	432.829	-57.00	3	13.10.2017 15:43	Oct11	02.0		
000003759		6	288	1.898	12.37	51.033000	0.119760	0.143712	0.322661	0.966183	5.5	0.548	35.872	473.202	-60.00	3	13.10.2017 15:43	Oct11	02.0	
000003760	flagella_5	6	289	1.448	10.71	51.999200	0.117363	0.140835	0.315613	0.946839	0.9	0.090	-7.491	458.510	60.00	3	13.10.2017 15:44	Oct11	02.0	
000003679		5	208	1.574	9.90	0.000000	0.267687	0.321224	0.719871	2.159613	0.5	0.050	-3.979	438.872	0.00	3	13.10.2017 14:38	Oct11	00.1	
000003680		5	209	1.664	11.67	2.159610	0.253186	0.254322	0.657037	1.971111	1.5	0.133	4.927	442.254	3.00	3	13.10.2017 14:39	Oct11	00.1	
000003681		5	210	1.736	12.16	4.130720	0.268257	0.321908	0.721404	2.164212	0.8	0.051	2.082	162.934	-3.00	3	13.10.2017 14:40	Oct11	00.1	
000003682		5	211	1.526	10.95	6.294930	0.278800	0.334560	0.749757	2.249271	0.8	0.048	-1.995	160.385	-6.00	3	13.10.2017 14:41	Oct11	00.1	
000003683		5	212	1.564	11.67	8.544200	0.278786	0.334543	0.749718	2.249154	0.4	0.020	-0.123	137.368	6.00	3	13.10.2017 14:41	Oct11	00.1	
000003684		5	213	1.693	7.80	10.793400	0.272701	0.327241	0.733354	2.200062	0.2	0.013	0.126	464.962	9.00	3	13.10.2017 14:42	Oct11	00.1	
000003685		5	214	1.723	14.07	12.993500	0.273809	0.331809	0.743592	2.230776	0.6	0.039	-1.413	207.384	-9.00	3	13.10.2017 14:44	Oct11	00.1	
000003686		5	215	1.766	11.96	15.224300	0.271325	0.325590	0.729655	2.188965	0.7	0.061	0.634	490.395	-12.00	3	13.10.2017 14:44	Oct11	00.2	
000003687		5	216	1.836	6.24	17.413300	0.264093	0.321711	0.720962	2.162886	0.2	0.017	0.474	452.738	12.00	3	13.10.2017 14:45	Oct11	00.2	
000003688		5	217	1.628	10.32	19.576200	0.265706	0.318847	0.714543	2.143629	0.7	0.050	-2.078	421.319	15.00	3	13.10.2017 14:46	Oct11	00.2	
000003689		5	218	1.691	15.43	21.719800	0.260965	0.313158	0.701794	2.105382	0.9	0.086	-5.439	487.428	-15.00	3	13.10.2017 14:47	Oct11	00.2	
000003690		5	219	1.768	12.93	23.825200	0.269584	0.323500	0.724971	2.174913	0.3	0.025	0.681	489.294	-18.00	3	13.10.2017 14:47	Oct11	00.2	
000003691		5	220	1.672	10.47	26.000100	0.249738	0.299685	0.671601	2.014803	1.1	0.062	0.571	216.039	18.00	3	13.10.2017 14:48	Oct11	00.2	
000003692		5	221	1.586	11.39	28.014900	0.263091	0.315709	0.707511	2.122533	0.8	0.074	-3.160	486.590	21.00	3	13.10.2017 14:50	Oct11	00.2	
000003693		5	222	1.680	12.48	30.137400	0.277788	0.333345	0.747034	2.241102	0.5	0.053	-1.561							

Prjör Dse[e/A2]	Counts/frm[e/px]	Dse/frm[e/px]	Dse/frm[e/A2]	Total Dse[e/A2]	Drift[A]	MaxDrift[A]	Deceleration[A/frm]	Jitter	TŁTANG	frames	L
0.000000	0.175153	0.210183	0.471025	1.413075	1.4	0.114	-0.381	451.71	0.00	3	1
1.413080	0.178230	0.213876	0.479300	1.437900	0.9	0.074	-0.273	468.23	3.00	3	1
2.850980	0.182491	0.218989	0.490758	1.472274	2.0	0.112	-1.322	202.87	-3.00	3	1
4.323250	0.171587	0.205904	0.461435	1.384305	0.8	0.083	1.490	486.27	-6.00	3	1
5.707550	0.187139	0.224566	0.503257	1.509771	0.8	0.083	3.972	486.14	6.00	3	1
7.217320	0.177450	0.212940	0.477203	1.431609	0.9	0.091	-8.249	498.50	9.00	3	1
8.648930	0.176234	0.211480	0.473931	1.421793	0.6	0.035	-0.921	196.11	-9.00	3	1
10.070700	0.180618	0.216741	0.485721	1.457163	0.8	0.077	-2.345	450.84	-12.00	3	1
11.527900	0.174600	0.209520	0.469538	1.408614	1.6	0.157	-10.180	436.68	12.00	3	1
12.936500	0.179003	0.214803	0.481378	1.444134	1.0	0.100	-5.027	495.18	15.00	3	1
14.380600	0.172790	0.207348	0.464672	1.394016	0.8	0.079	2.938	498.73	-15.00	3	1
15.774600	0.177366	0.212839	0.476977	1.430931	1.8	0.111	1.551	305.30	-18.00	3	1
17.205500	0.173421	0.208105	0.466368	1.399104	2.1	0.155	-1.214	412.77	18.00	3	1
18.604600	0.157511	0.189013	0.423582	1.270746	2.2	0.222	12.551	487.43	21.00	3	1
19.875300	0.179326	0.215191	0.482248	1.446744	1.4	0.082	1.682	187.22	-21.00	3	1
21.322000	0.160402	0.192482	0.431356	1.294068	0.7	0.046	-1.065	253.22	-24.00	3	1
22.616100	0.164906	0.197887	0.443470	1.330410	3.0	0.193	-8.298	181.32	24.00	3	1
23.946500	0.166401	0.199681	0.447489	1.342467	1.6	0.153	-5.122	478.76	27.00	3	1
25.289000	0.170034	0.204040	0.457258	1.371774	0.7	0.063	2.906	486.64	-27.00	3	1
26.660800	0.155015	0.186018	0.416871	1.250613	0.7	0.058	3.799	355.82	-30.00	3	1
27.911400	0.165248	0.198297	0.444387	1.333161	1.5	0.112	5.971	276.31	30.00	3	1
29.244600	0.163898	0.196677	0.440757	1.322271	2.3	0.181	11.766	331.28	33.00	3	1
30.566900	0.177977	0.213572	0.478619	1.435857	1.4	0.126	-8.121	419.52	-33.00	3	1
32.002800	0.159155	0.190986	0.428004	1.284012	2.2	0.221	-15.404	499.37	-36.00	3	1
33.286800	0.167327	0.200792	0.449979	1.349937	2.2	0.194	-6.935	444.95	36.00	3	1
34.636700	0.157082	0.188498	0.422428	1.267284	2.9	0.289	-16.923	490.43	39.00	3	1
35.904000	0.175856	0.211027	0.472916	1.418748	1.0	0.067	-1.791	290.67	-39.00	3	1
37.322700	0.144490	0.173388	0.388565	1.165695	3.9	0.375	5.431	498.46	-42.00	3	1
38.488400	0.155514	0.186616	0.418211	1.254633	2.5	0.246	16.290	443.72	42.00	3	1
39.743000	0.143965	0.172758	0.387154	1.161462	2.8	0.238	7.482	414.52	45.00	3	1
40.904500	0.156294	0.187552	0.420308	1.260924	2.3	0.214	15.031	445.54	-45.00	3	1
42.165400	0.136795	0.164154	0.367872	1.103616	1.5	0.150	11.941	499.38	-48.00	3	1
43.269000	0.140930	0.169116	0.378992	1.136976	3.1	0.204	-4.398	309.68	48.00	3	1
44.406000	0.130850	0.157020	0.351884	1.055652	6.3	0.633	46.152	460.05	51.00	3	1
45.461700	0.143065	0.171678	0.384733	1.154199	4.3	0.285	12.747	222.57	-51.00	3	1
46.615900	0.138341	0.166009	0.372029	1.116087	2.3	0.138	-4.097	96.982	-54.00	3	1
47.732000	0.135103	0.162123	0.363321	1.089963	3.2	0.231	7.796	351.83	54.00	3	1
48.822000	0.131275	0.157530	0.353028	1.059084	4.2	0.418	4.476	499.66	57.00	3	1
49.881100	0.142783	0.171339	0.383974	1.151922	2.7	0.252	-23.418	432.82	-57.00	3	1
51.033000	0.119760	0.143712	0.322061	0.966183	5.5	0.548	35.872	473.20	-60.00	3	1
51.999200	0.117363	0.140835	0.315613	0.946839	0.9	0.090	-7.491	458.51	60.00	3	1

Prior Dse[e/A2]	Counts/frm[e/px]	Dse/frm[e/px]	Dse/frm[e/A2]	Total Dse[e/A2]	Drift[A]	MaxDrift[A]	Deceleration[A/fm]	Jitter	TLTANG	frames	L
51.033000	0.119760	0.143712	0.322061	0.966183	5.5	0.548	35.872	473.202	-60.00	3	1
49.881100	0.142783	0.171339	0.383974	1.151922	2.7	0.252	-23.418	432.82	-57.00	3	1
46.615900	0.138341	0.166009	0.372029	1.116087	2.3	0.138	-4.097	96.982	-54.00	3	1
45.461700	0.143065	0.171678	0.384733	1.154199	4.3	0.285	12.747	222.57	-51.00	3	1
42.165400	0.136795	0.164154	0.367872	1.103616	1.5	0.150	11.941	499.38	-48.00	3	1
40.904500	0.156294	0.187552	0.420308	1.260924	2.3	0.214	15.031	445.54	-45.00	3	1
37.322700	0.144490	0.173388	0.388565	1.165695	3.9	0.375	5.431	498.46	-42.00	3	1
35.904000	0.175856	0.211027	0.472916	1.418748	1.0	0.067	-1.791	290.67	-39.00	3	1
32.002800	0.159155	0.190986	0.428004	1.284012	2.2	0.221	-15.404	499.37	-36.00	3	1
30.566900	0.177977	0.213572	0.478619	1.435857	1.4	0.126	-8.121	419.52	-33.00	3	1
26.660800	0.155015	0.186018	0.416871	1.250613	0.7	0.058	3.799	355.82	-30.00	3	1
25.289000	0.170034	0.204040	0.457258	1.371774	0.7	0.063	2.906	486.64	-27.00	3	1
21.322000	0.160402	0.192482	0.431356	1.294068	0.7	0.046	-1.065	253.22	-24.00	3	1
19.875300	0.179326	0.215191	0.482248	1.446744	1.4	0.082	1.682	187.22	-21.00	3	1
15.774600	0.177366	0.212839	0.476977	1.430931	1.8	0.111	1.551	305.30	-18.00	3	1
14.380600	0.172790	0.207348	0.464672	1.394016	0.8	0.079	2.938	498.73	-15.00	3	1
10.070700	0.180618	0.216741	0.485721	1.457163	0.8	0.077	-2.345	450.84	-12.00	3	1
8.648930	0.176234	0.211480	0.473931	1.421793	0.6	0.035	-0.921	196.11	-9.00	3	1
4.323250	0.171587	0.205904	0.461435	1.384305	0.8	0.083	1.490	486.27	-6.00	3	1
2.850980	0.182491	0.218989	0.490758	1.472274	2.0	0.112	-1.322	202.87	-3.00	3	1
0.000000	0.175153	0.210183	0.471025	1.413075	1.4	0.114	-0.381	451.71	0.00	3	1
1.413080	0.178230	0.213876	0.479300	1.437900	0.9	0.074	-0.273	468.23	3.00	3	1
5.707550	0.187139	0.224566	0.503257	1.509771	0.8	0.083	3.972	486.14	6.00	3	1
7.217320	0.177450	0.212940	0.477203	1.431609	0.9	0.091	-8.249	498.50	9.00	3	1
11.527900	0.174600	0.209520	0.469538	1.408614	1.6	0.157	-10.180	436.68	12.00	3	1
12.936500	0.179003	0.214803	0.481378	1.444134	1.0	0.100	-5.027	495.18	15.00	3	1
17.205500	0.173421	0.208105	0.466368	1.399104	2.1	0.155	-1.214	412.77	18.00	3	1
18.604600	0.157511	0.189013	0.423582	1.270746	2.2	0.222	12.551	487.43	21.00	3	1
22.616100	0.164906	0.197887	0.443470	1.330410	3.0	0.193	-8.298	181.32	24.00	3	1
23.946500	0.166401	0.199681	0.447489	1.342467	1.6	0.153	-5.122	478.76	27.00	3	1
27.911400	0.165248	0.198297	0.444387	1.333161	1.5	0.112	5.971	276.31	30.00	3	1
29.244600	0.163898	0.196677	0.440757	1.322271	2.3	0.181	11.766	331.28	33.00	3	1
33.286800	0.167327	0.200792	0.449979	1.349937	2.2	0.194	-6.935	444.95	36.00	3	1
34.636700	0.157082	0.188498	0.422428	1.267284	2.9	0.289	-16.923	490.43	39.00	3	1
38.488400	0.155514	0.186616	0.418211	1.254633	2.5	0.246	16.290	443.72	42.00	3	1
39.743000	0.143965	0.172758	0.387154	1.161462	2.8	0.238	7.482	414.52	45.00	3	1
43.269000	0.140930	0.169116	0.378992	1.136976	3.1	0.204	-4.398	309.68	48.00	3	1
44.406000	0.130850	0.157020	0.351884	1.055652	6.3	0.633	46.152	460.05	51.00	3	1
47.732000	0.135103	0.162123	0.363321	1.089963	3.2	0.231	7.796	351.83	54.00	3	1
48.822000	0.131275	0.157530	0.353028	1.059084	4.2	0.418	4.476	499.66	57.00	3	1
51.999200	0.117363	0.140835	0.315613	0.946839	0.9	0.090	-7.491	458.51	60.00	3	1

# FOCUS – Typical Workflow: Electron Tomography

Focus (1.1.0) | Current Project: flagella | Project Directory: /data/Users/Thorsten/105kx\_flagella

Library Import Process Export Preferences

Process Selected Auto Selection Tool 533 selected and 1 highlighted

Select	Directory	Flag	Spec Num	File Number	Defocus[um]	CTFres	Prior Dse[A/2]	Counts/f/frm[epx]	Dse/f/frm[epx]	Dse/f/frm[A/2]	Total Dse[A/2]	Drift[A]	MaxDrift[A]	Deceleration[A/m]	Jitter	TLTANG	frames	Last Processed	Day	Time	
<input type="checkbox"/>	flagella_6																				
<input type="checkbox"/>	000003759	6	288	1.898	12.37	51.033000	0.119760	0.143712	0.322061	0.966183	5.5	0.548	35.872	473.202	-60.00	3	13.10.2017	15:43	Oct11	02.0	
<input type="checkbox"/>	000003758	6	287	1.906	8.44	49.881100	0.142783	0.171339	0.383974	1.151922	2.7	0.252	-23.418	432.829	-57.00	3	13.10.2017	15:43	Oct11	02.0	
<input type="checkbox"/>	000003755	6	284	1.696	11.76	46.615900	0.138341	0.166009	0.372029	1.116087	2.3	0.138	-4.097	96.982	-54.00	3	13.10.2017	15:41	Oct11	01.5	
<input type="checkbox"/>	000003754	6	283	0.402	inf	45.461700	0.143065	0.171678	0.384733	1.154199	4.3	0.285	12.747	222.572	-51.00	3	13.10.2017	15:40	Oct11	01.5	
<input type="checkbox"/>	000003751	6	280	0.686	5.76	42.165400	0.150795	0.164154	0.367872	1.103616	1.5	0.150	11.941	499.382	-48.00	3	13.10.2017	15:38	Oct11	01.5	
<input type="checkbox"/>	000003750	6	279	0.582	4.20	40.904500	0.156294	0.187552	0.420308	1.260924	2.3	0.214	15.031	445.549	-45.00	3	13.10.2017	15:37	Oct11	01.5	
<input type="checkbox"/>	000003747	6	276	0.648	7.36	37.322700	0.144490	0.173388	0.388565	1.165695	3.9	0.375	5.431	498.464	-42.00	3	13.10.2017	15:36	Oct11	01.4	
<input type="checkbox"/>	000003746	6	275	0.951	8.25	35.904400	0.157556	0.211027	0.472916	1.418748	1.0	0.067	-1.791	290.673	-39.00	3	13.10.2017	15:35	Oct11	01.4	
<input type="checkbox"/>	000003743	6	272	0.678	7.07	32.002800	0.159155	0.190986	0.428004	1.284012	2.2	0.221	-15.404	499.376	-36.00	3	13.10.2017	15:33	Oct11	01.4	
<input type="checkbox"/>	000003742	6	271	1.022	9.26	30.566900	0.171377	0.213572	0.478617	1.435857	1.4	0.126	-8.130	419.581	-33.00	3	13.10.2017	15:32	Oct11	01.3	
<input type="checkbox"/>	000003739	6	268	1.402	10.18	26.660800	0.155015	0.186018	0.416871	1.250613	0.7	0.058	3.799	355.827	-30.00	3	13.10.2017	15:30	Oct11	01.3	
<input type="checkbox"/>	000003738	6	267	0.814	7.71	25.289000	0.170034	0.204040	0.457258	1.371774	0.7	0.062	2.906	486.646	-27.00	3	13.10.2017	15:30	Oct11	01.3	
<input type="checkbox"/>	000003735	6	264	0.116	inf	21.322000	0.160402	0.192482	0.431356	1.294068	0.7	0.046	-1.065	253.220	-24.00	3	13.10.2017	15:27	Oct11	01.2	
<input type="checkbox"/>	000003734	6	263	0.292	5.69	19.875300	0.179326	0.215191	0.482248	1.446744	1.4	0.082	1.682	187.222	-21.00	3	13.10.2017	15:26	Oct11	01.2	
<input type="checkbox"/>	000003731	6	260	0.118	inf	15.774600	0.177366	0.212809	0.476977	1.430931	1.8	0.111	1.551	305.304	-18.00	3	13.10.2017	15:23	Oct11	01.2	
<input type="checkbox"/>	000003730	6	259	0.230	6.43	14.380600	0.172790	0.207348	0.464672	1.394016	0.8	0.079	2.938	498.738	-15.00	3	13.10.2017	15:22	Oct11	01.2	
<input type="checkbox"/>	000003727	6	256	0.117	inf	10.070700	0.180618	0.216741	0.457163	1.407771	0.8	0.077	-2.345	450.846	-12.00	3	13.10.2017	15:20	Oct11	01.2	
<input type="checkbox"/>	000003726	6	255	0.472	6.97	8.648930	0.176234	0.211480	0.473931	1.421793	0.6	0.035	-0.921	196.118	-9.00	3	13.10.2017	15:19	Oct11	01.1	
<input type="checkbox"/>	000003723	6	252	0.116	inf	4.323250	0.171587	0.205904	0.461435	1.384305	0.8	0.083	1.490	486.272	-6.00	3	13.10.2017	15:17	Oct11	01.1	
<input type="checkbox"/>	000003722	6	251	1.901	0.332	2.850980	0.178989	0.249058	0.472274	1.472274	2.0	0.112	-1.322	202.877	-3.00	3	13.10.2017	15:16	Oct11	01.1	
<input type="checkbox"/>	000003720	6	249	-0.065	3.03	0.000000	0.175153	0.210183	0.471025	1.413075	1.4	0.114	-0.381	451.711	0.00	3	13.10.2017	15:15	Oct11	01.0	
<input type="checkbox"/>	000003721	6	250	1.696	11.86	1.413080	0.179300	0.213876	0.473900	0.9	0.074	-0.273	468.232	3.00	3	13.10.2017	15:16	Oct11	01.1		
<input type="checkbox"/>	000003724	6	253	0.591	4.72	5.707550	0.187139	0.224566	0.503257	1.509771	0.8	0.083	3.972	486.147	6.00	3	13.10.2017	15:19	Oct11	01.1	
<input type="checkbox"/>	000003725	6	254	-0.080	5.83	7.217320	0.177450	0.212940	0.477203	1.431609	0.9	0.091	-8.249	498.508	9.00	3	13.10.2017	15:18	Oct11	01.1	
<input type="checkbox"/>	000003728	6	257	0.843	8.75	11.527900	0.179900	0.209520	0.469538	1.440814	1.6	0.157	-10.180	456.688	12.00	3	13.10.2017	15:21	Oct11	01.2	
<input type="checkbox"/>	000003729	6	258	0.117	inf	12.936500	0.179003	0.214803	0.481378	1.444134	1.0	0.100	-5.027	495.181	15.00	3	13.10.2017	15:21	Oct11	01.2	
<input type="checkbox"/>	000003732	6	261	0.388	7.67	17.205500	0.173421	0.208105	0.466368	1.399104	2.1	0.155	-1.214	412.773	18.00	3	13.10.2017	15:24	Oct11	01.2	
<input type="checkbox"/>	000003733	6	262	-0.129	5.72	18.604600	0.157511	0.189013	0.423582	1.270746	2.2	0.222	12.551	487.435	21.00	3	13.10.2017	15:25	Oct11	01.2	
<input type="checkbox"/>	000003736	6	265	1.936	15.43	22.616100	0.164906	0.197887	0.443470	1.330410	3.0	0.193	-8.298	181.322	24.00	3	13.10.2017	15:28	Oct11	01.3	
<input type="checkbox"/>	000003737	6	266	-0.102	5.46	23.946500	0.166401	0.199681	0.447489	1.342467	1.6	0.153	-5.122	478.769	27.00	3	13.10.2017	15:29	Oct11	01.3	
<input type="checkbox"/>	000003740	6	269	-0.024	inf	27.911400	0.165297	0.184387	0.443387	1.333161	1.5	0.112	1.971	376.311	30.00	3	13.10.2017	15:31	Oct11	01.3	
<input type="checkbox"/>	000003741	6	270	-0.077	5.26	29.244000	0.163898	0.196677	0.440577	1.322271	2.3	0.189	-11.766	331.289	33.00	3	13.10.2017	15:32	Oct11	01.3	
<input type="checkbox"/>	000003744	6	273	-0.087	5.56	33.286800	0.167327	0.200792	0.449979	1.349937	2.2	0.194	-6.935	444.955	36.00	3	13.10.2017	15:34	Oct11	01.4	
<input type="checkbox"/>	000003745	6	274	-0.160	6.32	34.636700	0.157082	0.188498	0.422428	1.267284	2.9	0.289	-16.923	490.431	39.00	3	13.10.2017	15:34	Oct11	01.4	
<input type="checkbox"/>	000003748	6	277	2.107	13.04	38.488400	0.155514	0.186616	0.418211	1.254633	2.5	0.246	16.290	443.720	42.00	3	13.10.2017	15:36	Oct11	01.4	
<input type="checkbox"/>	000003749	6	278	-0.122	5.81	39.743000	0.147965	0.172758	0.387154	1.161462	2.8	0.238	7.482	414.527	45.00	3	13.10.2017	15:37	Oct11	01.4	
<input type="checkbox"/>	000003752	6	281	0.777	10.40	43.269900	0.149030	0.169116	0.378992	1.136976	3.1	0.204	-4.398	309.685	48.00	3	13.10.2017	15:39	Oct11	01.5	
<input type="checkbox"/>	000003753	6	282	1.514	10.95	44.406000	0.130850	0.157020	0.351884	1.055652	6.3	0.633	46.152	460.050	51.00	3	13.10.2017	15:39	Oct11	01.5	
<input type="checkbox"/>	000003756	6	285	1.332	13.54	47.732000	0.135103	0.162123	0.363321	1.089963	3.2	0.231	7.796	351.831	54.00	3	13.10.2017	15:41	Oct11	01.5	
<input type="checkbox"/>	000003757	6	286	1.583	11.21	48.822000	0.131275	0.157530	0.353028	1.059804	4.2	0.418	4.476	499.664	57.00	3	13.10.2017	15:42	Oct11	02.0	
<input type="checkbox"/>	000003760	6	289	1.448	10.71	51.999200	0.117363	0.140835	0.946839	0.9	0.090	-7.491	458.510	60.00	3	13.10.2017	15:44	Oct11	02.0		
<input type="checkbox"/>	flagella_5																				
<input type="checkbox"/>	000003718	5	247	1.915	12.26	77.898100	0.193395	0.232074	0.520083	1.560249	0.8	0.074	1.748	480.331	-60.00	3	13.10.2017	15:13	Oct11	01.0	
<input type="checkbox"/>	000003717	5	246	1.637	9.63	76.124100	0.263872	0.591432	1.774026	5.0	0.054	2.437	179.505	-57.00	3	13.10.2017	15:12	Oct11	01.0		
<input type="checkbox"/>	000003714	5	243	1.937	10.47	71.316800	0.204569	0.245482	0.550131	1.650393	1.4	0.141	7.696	499.850	-54.00	3	13.10.2017	15:10	Oct11	00.5	
<input type="checkbox"/>	000003713	5	242	1.684	11.57	69.526300	0.221936	0.266323	0.598636	1.790508	0.4	0.042	2.039	485.145	-51.00	3	13.10.2017	15:09	Oct11	00.5	
<input type="checkbox"/>	000003710	5	239	1.822	10.55	64.279400	0.222100	0.246520	0.592728	1.791834	0.9	0.096	6.599	493.551	-48.00	3	13.10.2017	15:06	Oct11	00.5	
<input type="checkbox"/>	000003709	5	238	1.617	10.87	62.338300	0.240605	0.288726	0.647041	1.941123	0.9	0.061	-1.677	329.706	-45.00	3	13.10.2017	15:05	Oct11	00.5	
<input type="checkbox"/>	000003706	5	235	1.824	14.79	56.970400	0.223146	0.267775	0.600089	1.800267	0.9	0.062	4.644	493.850	-42.00	3	13.10.2017	15:02	Oct11	00.4	
<input type="checkbox"/>	000003705	5	234	1.669	11.96	54.958700	0.249357	0.299228	0.670577	2.011731	0.6	0.057	-4.308	405.016	-39.00	3	13.10.2017	15:01	Oct11	00.4	
<input type="checkbox"/>	000003702	5	231	1.677	10.25	48.953500	0.250578	0.300693	0.673860	2.021580	0.5	0.033	0.074	368.874	-36.00	3	13.10.2017	14:59	Oct11	00.4	
<input type="checkbox"/>	000003701	5	230	1.646	12.70	46.806200	0.266162	0.319394	0.715769	2.473707	0.6	0.052	-3.881	369.362	-33.00	3	13.10.2017	14:58	Oct11	00.4	
<input type="checkbox"/>	000003698	5	227	1.673	11.48	40.803000	0.258878	0.310653	0.696181	2.088543	1.2	0.094	-0.534	456.681	-30.00	3	13.10.2017	14:55	Oct11	00.3	
<input type="checkbox"/>	000003697	5	226	1.741	13.67	38.670300	0.264352	0.317222	0.710902	2.132706	0.9	0.069	-3.263	3							

# FOCUS – Typical Workflow: Electron Tomography

The screenshot displays the FOCUS software interface during the 'Export Tomo Tiltseries' workflow. The top navigation bar includes 'Project', 'Library', 'Import', 'Process', and 'Export' buttons. The main window is titled 'Export Tomo Tiltseries' and is divided into several sections:

- EXPORT IMAGES AND DATA:** A sidebar menu with options: 'Export to central', 'Export Images&CTF data', 'Export Tomo Tiltseries' (selected), and 'Export Parameter Settings'.
- Export Data Master:** A central area with a text input field containing 'TILTseries' and a 'Directory for tilt series to export to' label.
- Output (Double click for logbrowser):** A large text area showing the execution log. The log indicates that 20 specimen directories will be created, listing them from 'TILTseries/Flagella\_10\_stack.mros' to 'TILTseries/Flagella\_9\_stack.mros'. The process concludes with 'export\_tomo\_tiltseries - normal end.' and 'export\_tomo\_tiltseries finished.'
- DEPENDENT SCRIPTS:** A small section at the bottom left showing a script named 'initialize'.
- Results:** A panel on the right side, currently empty, with a 'Parameter Value' table.
- Images (Double click here for folder):** A panel below the results, also empty.
- File Preview:** A panel at the bottom right, currently empty.

```
#####export_tomo_tiltseries#####
Will work on 20 specimens, in total 820 image directories.
Creating ../TILTseries/Flagella_10_stack.mros
Creating ../TILTseries/Flagella_11_stack.mros
Creating ../TILTseries/Flagella_12_stack.mros
Creating ../TILTseries/Flagella_13_stack.mros
Creating ../TILTseries/Flagella_14_stack.mros
Creating ../TILTseries/Flagella_15_stack.mros
Creating ../TILTseries/Flagella_16_stack.mros
Creating ../TILTseries/Flagella_17_stack.mros
Creating ../TILTseries/Flagella_18_stack.mros
Creating ../TILTseries/Flagella_19_stack.mros
Creating ../TILTseries/Flagella_20_stack.mros
Creating ../TILTseries/Flagella_21_stack.mros
Creating ../TILTseries/Flagella_22_stack.mros
Creating ../TILTseries/Flagella_3_stack.mros
Creating ../TILTseries/Flagella_4_stack.mros
Creating ../TILTseries/Flagella_5_stack.mros
Creating ../TILTseries/Flagella_6_stack.mros
Creating ../TILTseries/Flagella_7_stack.mros
Creating ../TILTseries/Flagella_8_stack.mros
Creating ../TILTseries/Flagella_9_stack.mros
==== export_tomo_tiltseries - normal end. =====
#####export_tomo_tiltseries finished.#####
```

## FOCUS – Typical Workflow: Electron Tomography

---

- **Import from SerialEM:** K2 movies, 8k x 8k, 7 frames, TIFF LZV compressed.
- Assign Movies to Tilt Series. Learn tilt angle from file name.
- **Unpack, MotionCor2 on 8k movies.**
  - MotionCor2 Fourier-crops to 4k after drift correction.
  - Take PRIOR DOSE into account.
  - Create dose-weighted averages.
- **CTFFIND4 / gCTF**
- **Measure Iciness**
- **Push statistics to STATUS** website server
- **Cleanup** to delete temporary files
- **Synchronize to FOCUS-CENTRAL**

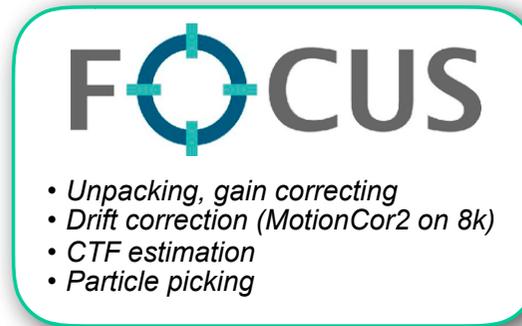
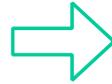
### ***Export function:***

- ***Re-order by tilt angle***
- ***merge into one MRC Stack per tilt series.***

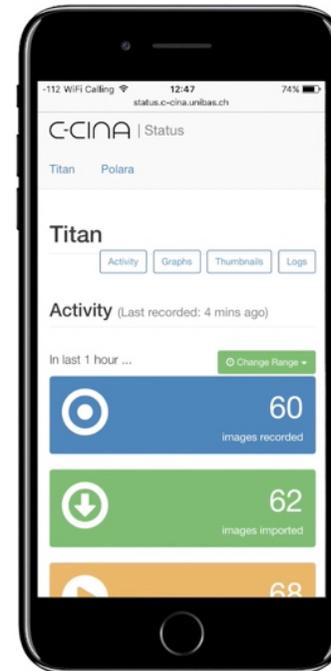
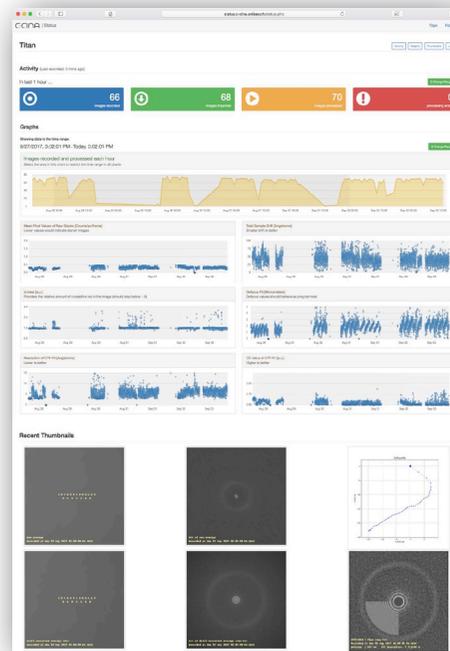
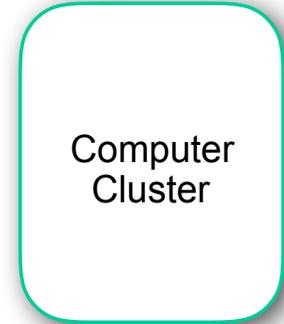
# FOCUS – STATUS Website



70 to 120 movies / hour



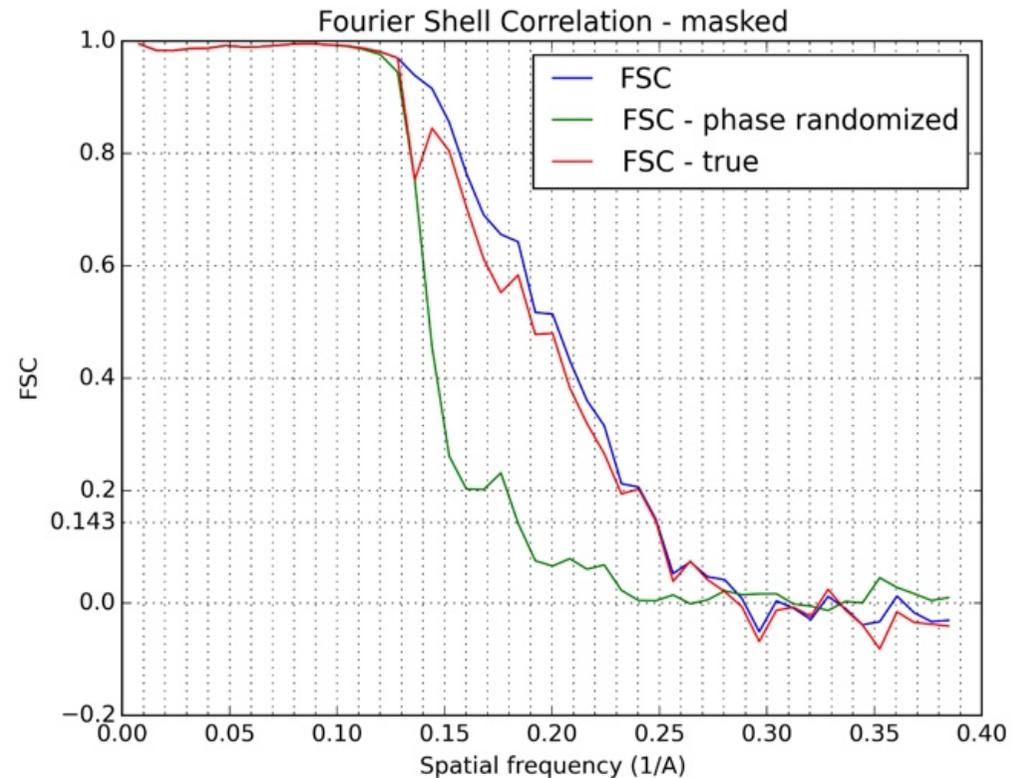
up to 130 movies / hour (4 x Titan Xp GPU)



Ours is at:  
<http://status.c-cina.unibas.ch>

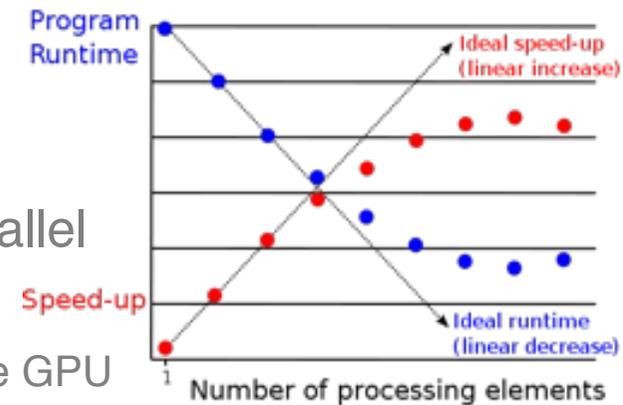
# focus.postprocess

- Python program for postprocessing 3D maps
- Based on mrcz.ioMRC: <http://github.com/em-MRCZ> (McLeod et al., JSB 2017)
- Distributed with FOCUS: <http://focus-em.org>
- Includes many features from RELION, FREALIGN, EMAN2, IMAGIC and more:
  - Smart auto-masking (flood-filling method)
  - FSC High-Resolution Noise-Substitution
  - FSC volume normalization (based on MW)
  - 1/2-bit and 3-Sigma criteria
  - Directional FSCs
  - Sharpening B-factor determination
  - Sharpening by whitening
  - Can also be used only for masking and/or filtering maps
  - Works in 2D and 3D
  - High-quality plots
  - Logs complete description of options and filters applied



# Tips & tricks

- Find the optimal number of movies you can process in parallel
  - HyperThreading is fine in principle, but risks oversubscribing and thus making the performance *worse*
- The size of FASTDISK also limits how many you can do in parallel
- Beware of MotionCor2 versions
  - Newer versions have problems if running multiple instances on the same GPU
- The “Manage Project” tab is handy!
  - Especially the “Search” & “Synchronize” parameters tools!
- **Always** test your parameters on a few images before starting importing automatically
- All Focus-bundled executable are also available from your command line (MRC package, 2dx package, Python scripts, etc)
- Ready-to-run scripts are saved under `merge/proc/`
  - Useful for launching things remotely / submitting to cluster



[https://en.wikipedia.org/wiki/Parallel\\_slowdown](https://en.wikipedia.org/wiki/Parallel_slowdown)

# Perspectives

- Support MRCZ (McLeod et al., JSB 2017)
  - More useful if external programs also adopt it
- Own generation of gain-reference (McLeod et al., bioRxiv 2017; Afanasyev et al., Sci. Rep. 2015)
- More integration with RELION
  - All the way to online 3D refinement
- More integration with cisTEM (thanks Alexis Rohou)
  - GPUs might not be necessary anymore?
- Improvements on the status page

RELION

CISTEM

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**David Mastronarde**, Boulder  
**Niko Grigorieff**, Janelia

- FOCUS interfaces your data acquisition computer with the software you commonly use to process your data
- FOCUS is highly customizable
- Publication:  
Biyani, N., Righetto, R.D., McLeod, R., Caujolle-Bert, D., Castano-Diez, D., Goldie, K.N., Stahlberg, H., 2017. *Focus: The interface between data collection and data processing in cryo-EM*. J. Struct. Biol. 198, 124–133. doi:10.1016/j.jsb.2017.03.007
- Documentation: [focus-em.org](http://focus-em.org)
  - Includes *YouTube* tutorials!
- Source code: [github.com/C-CINA/focus](https://github.com/C-CINA/focus)
- Bug reports, feature requests: [github.com/C-CINA/focus/issues](https://github.com/C-CINA/focus/issues)

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