


# Input parameters

```
17
18 # EDS mapping conditions
19 dwell_time = 0.1 # in second      Dwell time in second
20 frame_num = 1 # frame number      Frame number
21 image_size_x = 16 # in pixel
22 image_size_y = 16 # in pixel      } Pixel size
23
24 # Timing conditions
25 Adjust_constant = 0 | Coefficient to adjust dwell time (Slide 3 - 5)
26 eff_dwell_time = dwell_time + Adjust_constant # Actual dwell time (s)
27 wait_time=0.4           Wait time (Slide 8)
28
29 # Rocking conditions
30 tilt_semi_angle = 40      Rocking angle in mrad
31 tilt_rotation = 0 # Tilt rotation angle in degree (Slide 9) (positive is clock wise)
```



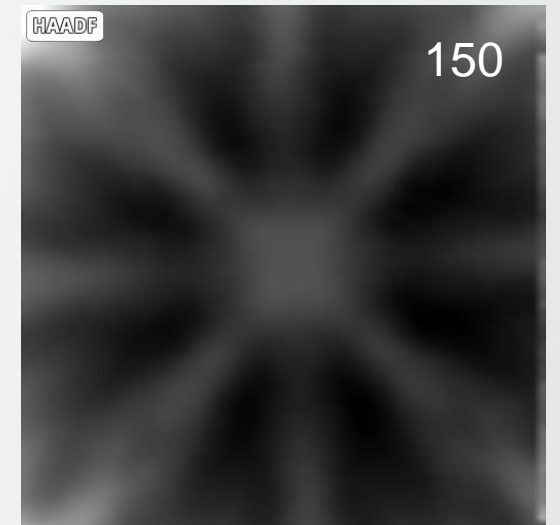
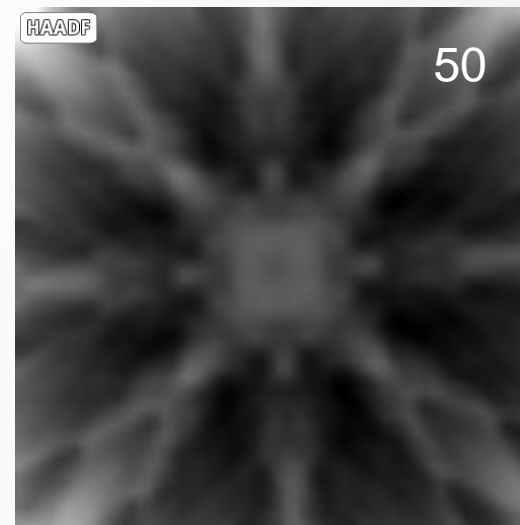
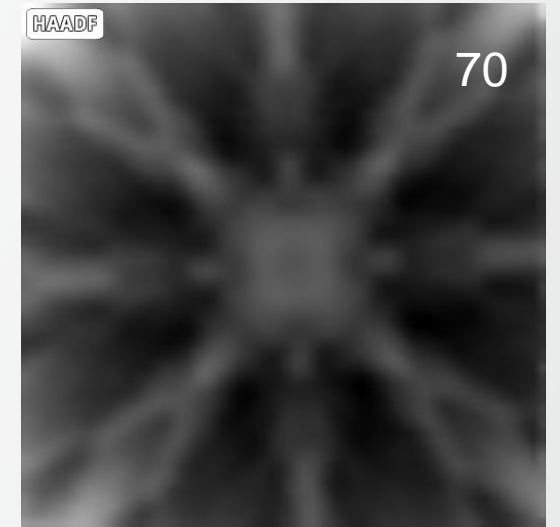
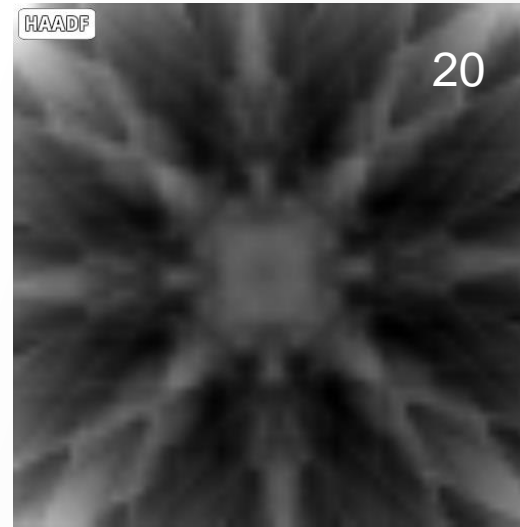
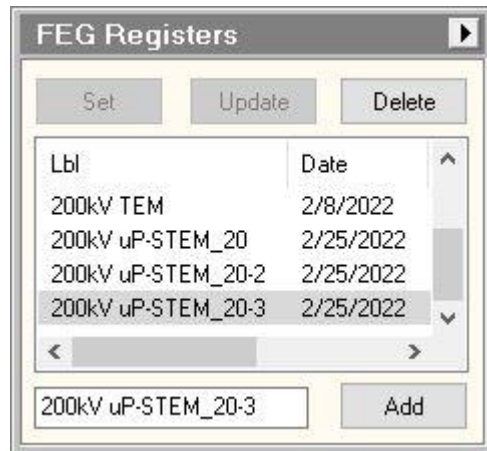
The screenshot shows the software's acquisition settings panel. It includes a 'SI' dropdown menu, a '64 x 64' image size, a 'Dwell time' of '100 ms (8.2 min)', and 'Auto stop' set to '1 frame (8.2 min)'. There are checkboxes for 'Auto stop', 'Drift compensation', and 'Optimize for periodic images'. A 'Restore defaults' button is also present. Under the 'After acquisition:' section, 'Blank beam' is checked and 'Close column valves' is unchecked.

Note: If the script is run to the end, the beam tilt will be reset.

However, if the script is stopped midway, the beam remains tilted.

# Preparation

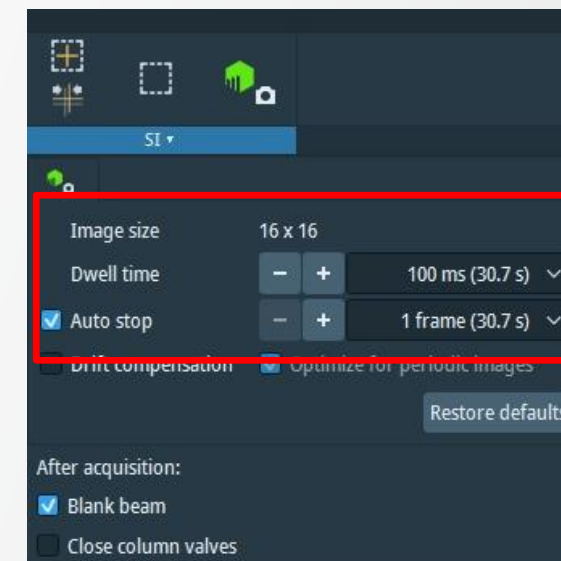
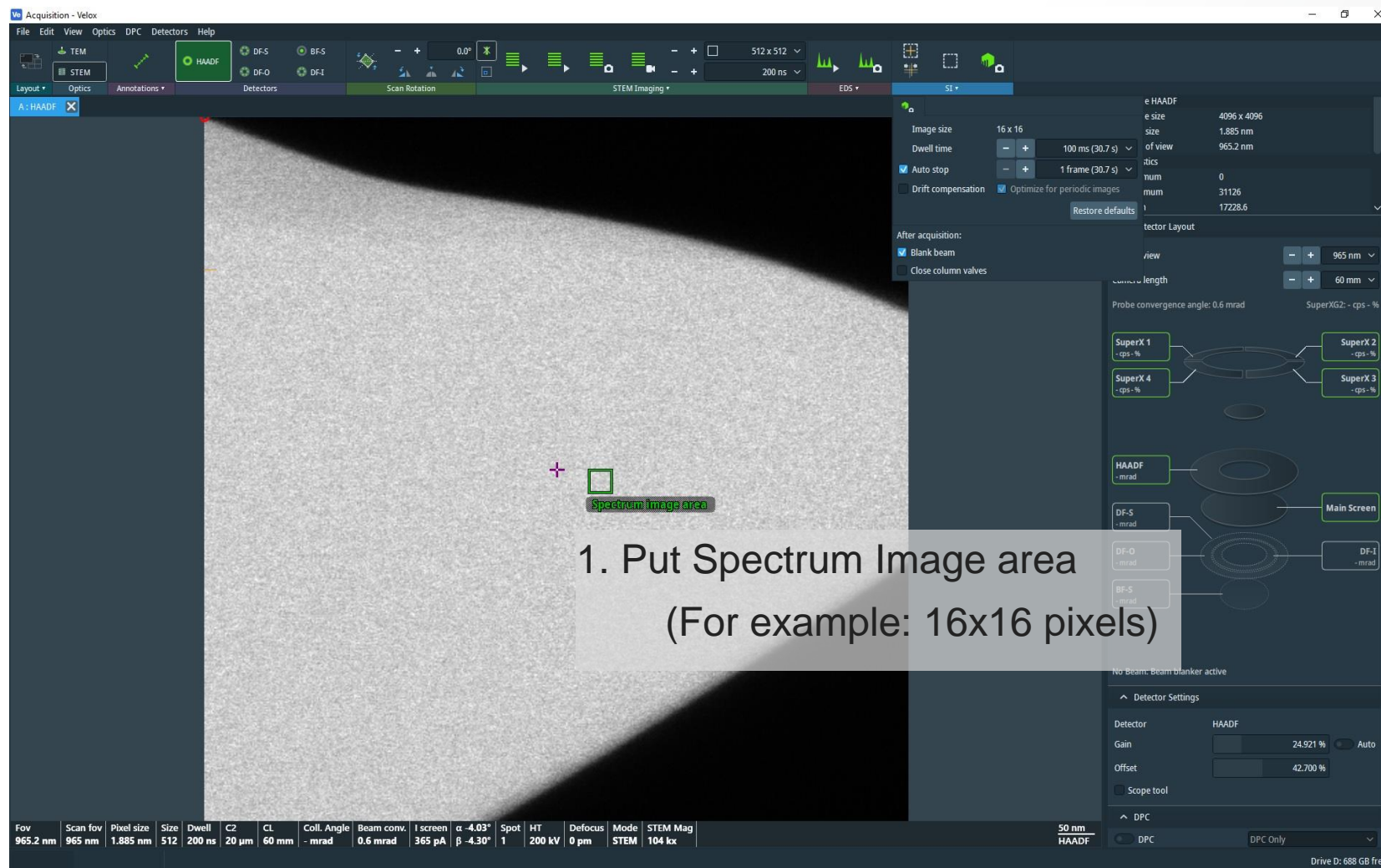
1. Set microscope mode for Rocking-beam EDS  
Mode: uProbe-STEM  
C2 aperture: Smaller is better (Right figure)
2. Perform Direct Alignment
3. Save/update FEG registers after Direct alignment  
so that the beam tilt can be reset



C2 aperture size dependence (STO [100])

# Preparation –Dwell time adjustment–

This procedure is necessary when the dwell time is changed

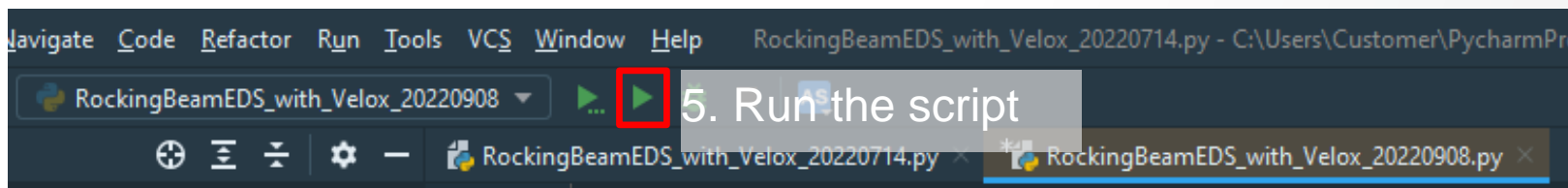
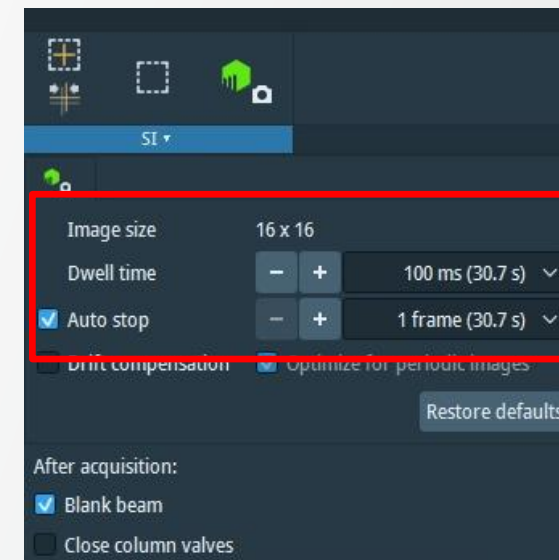


2. Set parameters  
(For example: 100ms, 1 frame)

# Preparation –Dwell time adjustment–

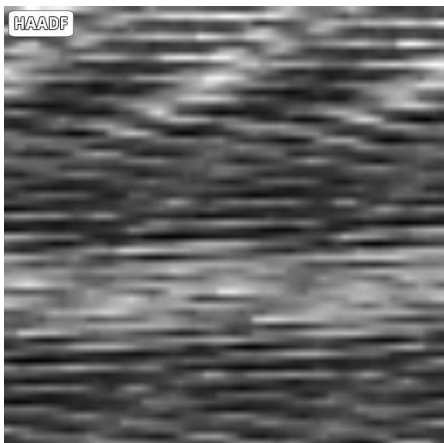
```
17
18 # EDS mapping conditions
19 dwell_time = 0.1 # in second
20 frame_num = 1 # frame number
21 image_size_x = 16 # in pixel
22 image_size_y = 16 # in pixel
23
24 # Timing conditions
25 Adjust_constant = 0 ← 4. Input "0" for Adjust_constant.
26 eff_dwell_time = dwell_time + Adjust_constant # Actual dwell time (subtract)
27 wait_time=0.4
```

3. Input the same parameters as Velox



```
RockingBeamEDS_with_Velox_20220908
C:\FEI\Python\EDM\envs\AutoScript\python.exe C:/Users/Customer/PycharmProjects/20220908/RockingBeamEDS_with_Velox_20220908.py
Client connecting to [192.168.0.1:7521]...
Client connected to [192.168.0.1:7521]
Starting blank check
Beam is blanked
Waiting for unblank. Please start EDS map with Velox. ← 6. Start EDS map by Velox after this comment appears
```

# Preparation -Dwell time adjustment-



Alchemi pattern is not seen  
due to different dwell time

```
18 # EDS mapping conditions
19 dwell_time = 0.1 # in second
20 frame_num = 1 # frame number
21 image_size_x = 16 # in pixel
22 image_size_y = 16 # in pixel
23
24 # Timing conditions
25 Adjust_constant = -0.04425802137702703 ← 8. Paste coefficient to the script
26 eff_dwell_time = dwell_time + Adjust_constant # Actual dwell time (subtract input dwell time from processing time)
27 wait_time=0.4
28
29 # Rocking conditions
30 tilt_semi_angle = 40 # in mrad
31 tilt_rotation = 0 # in degree (positive value is clock wise)
```

Copy & Paste

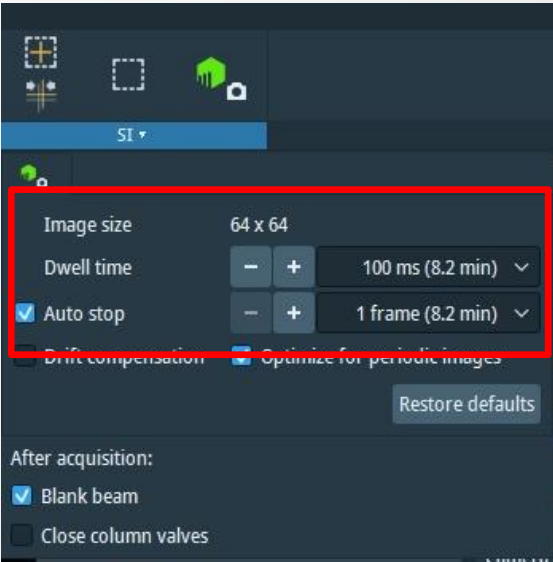
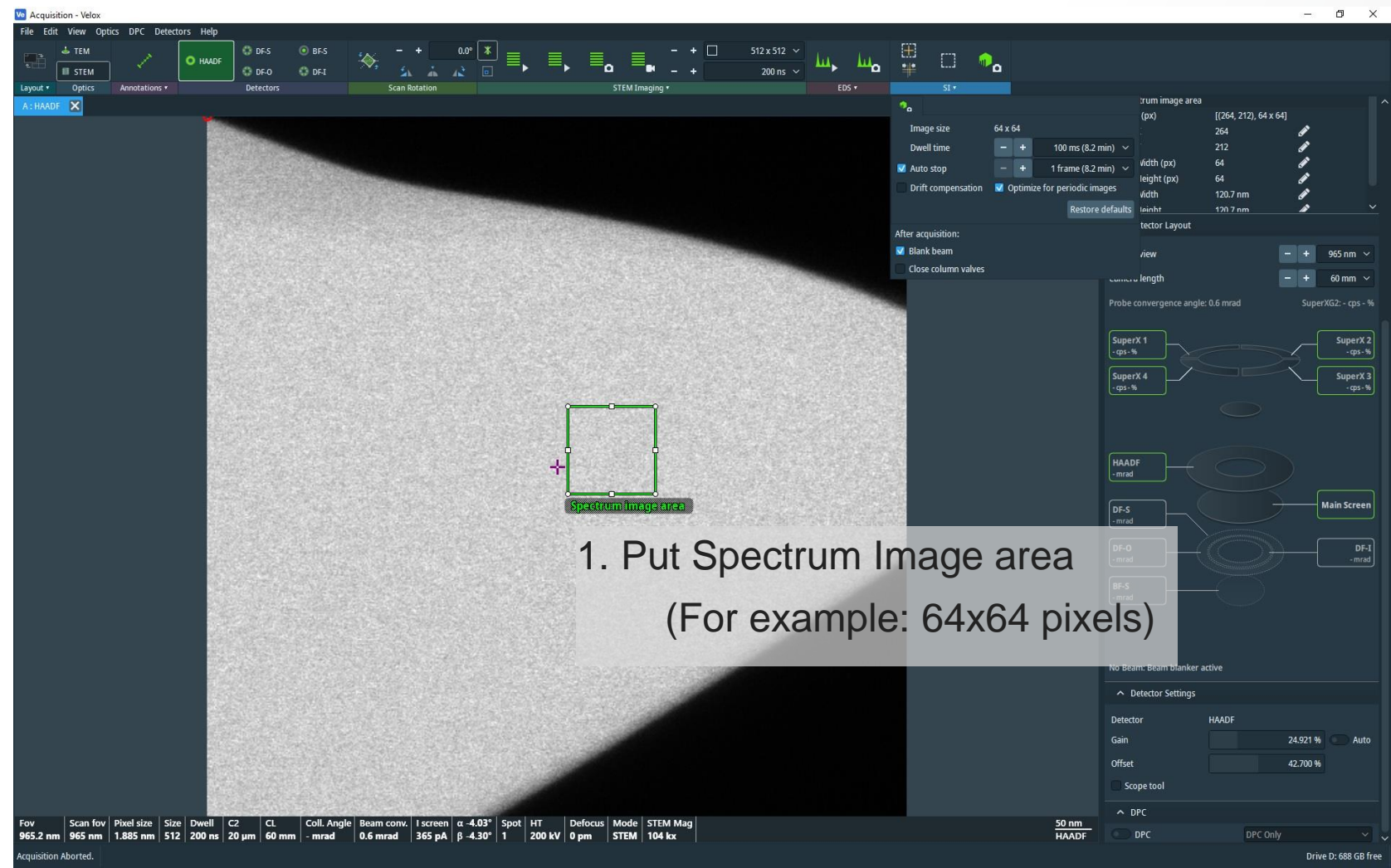
Run: RockingBeamEDS\_with\_Velox\_20220908 x

```
15 10
15 11
15 12
15 13
15 14
15 15
Adjustment time (s): -0.04425802137702703 ← 7. Copy coefficient
Process finished with exit code 0
```

Adjustment time appears after the script is finished



# Rocking-beam EDS acquisition

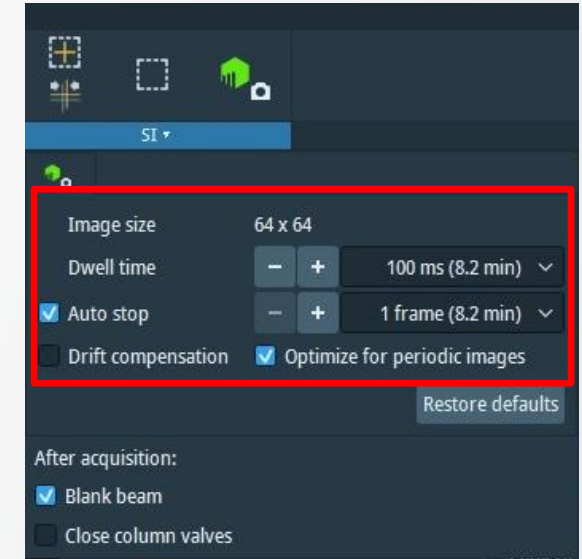


- 2. Set parameters
- Frame integration is available

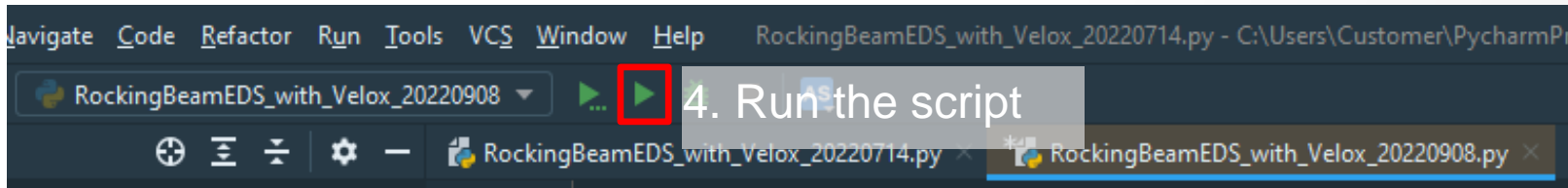
# Rocking-beam EDS acquisition

```
17
18 # EDS mapping conditions
19 dwell_time = 0.1 # in second
20 frame_num = 1 # frame number
21 image_size_x = 64 # in pixel
22 image_size_y = 64 # in pixel
23
24 # Timing conditions
25 Adjust_constant = -0.04425802137702703
26 eff_dwell_time = dwell_time + Adjust_constant # Actual dwell time (subtr
27 wait_time=0.4
```

3. Input the same parameters as Velox



Uncheck “Drift compensation”  
in case of multi frame acquisition.



```
RockingBeamEDS_with_Velox_20220908 x
C:\FEI\Python\EDM\envs\AutoScript\python.exe C:/Users/Customer/PycharmProjects/20220908/RockingBeamEDS_with_Velox_20220908.py
Client connecting to [192.168.0.1:7521]...
Client connected to [192.168.0.1:7521]
Starting blank check
Beam is blanked
Waiting for unblank. Please start EDS map with Velox.
```

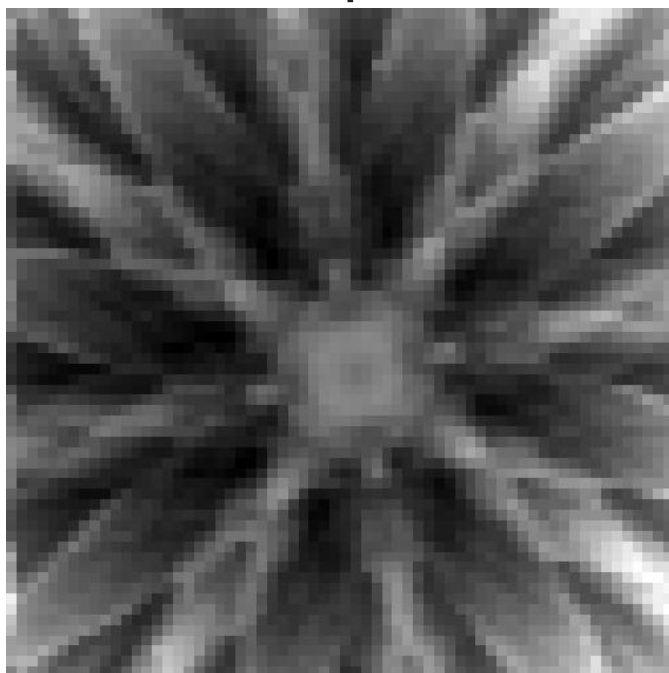
← 5. Start EDS map by Velox after this comment appears

## Appendix: Wait time

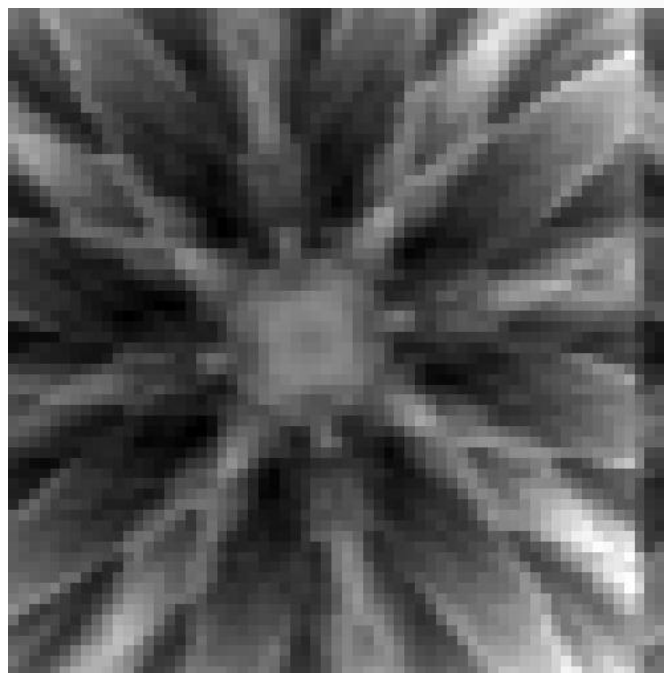
“wait\_time” adjusts the start time of EDS mapping and that of rocking beam.

```
24 # Timing conditions
25 Adjust_constant = -0.04425802137702703
26 eff_dwell_time = dwell_time + Adjust_constant
27 wait_time=0.4
```

Proper

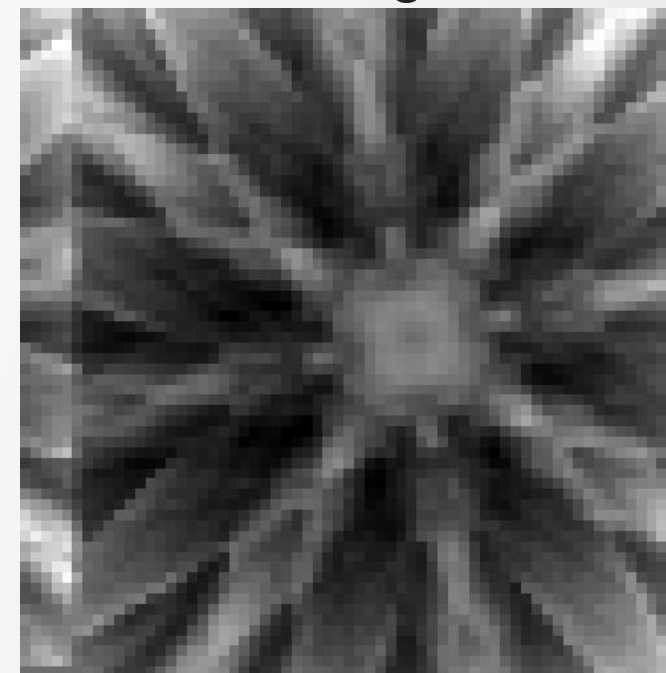


Short



Peculiar lines appear on the right side of the mapping.

Long

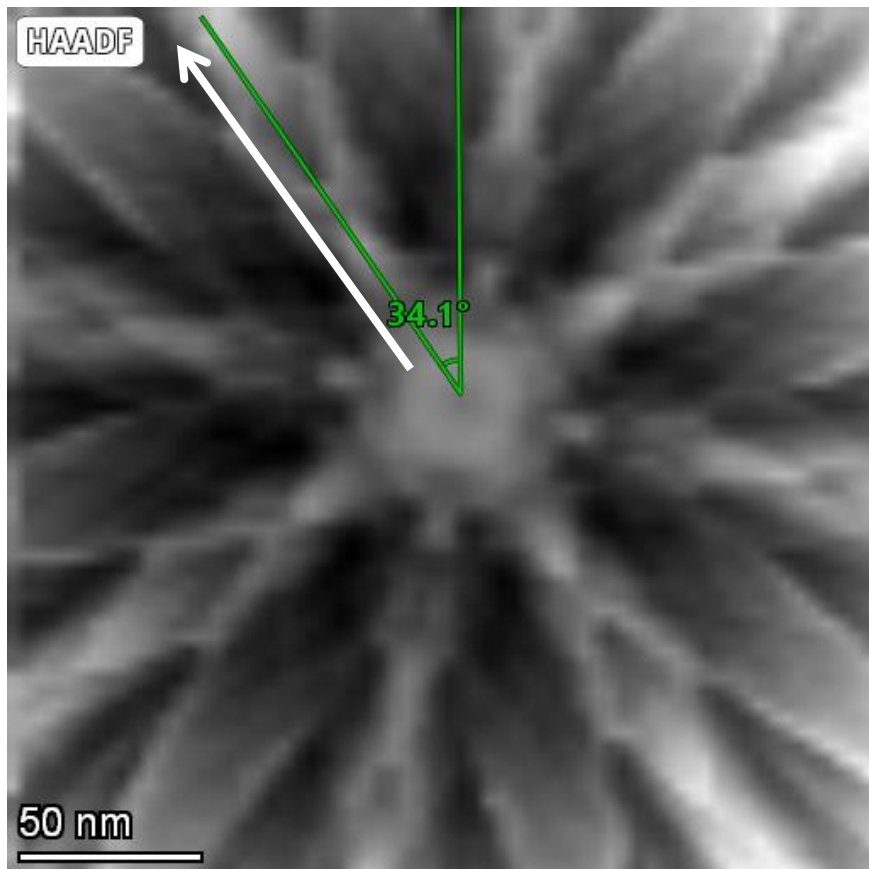


Peculiar lines appear on the left side of the mapping.



## Appendix: tilt\_rotation

“tilt\_rotation” rotates the mapping.



```
28  
29 # Rocking conditions  
30 tilt semi angle = 40  
31 tilt_rotation = 34.1 | #
```

