

# EPU 3.9.1

## Release Notes

PN 1551169

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## Technical Publications

Technical Publications Team - Hillsboro

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## Document History

Rev A, August 2024

# Introduction

## Purpose

This document describes the Thermo Fisher Scientific EPU software releases.

## Audience and Scope

These release notes are intended for users of the Thermo Fisher Scientific EPU software and those who manage the installation of Thermo Fisher Scientific EPU software on the microscope computer.

This document describes the content of the most recent and few historic EPU releases.

## Hardware Requirements

The EPU software can be used on the Microscope PC of Thermo Fisher Scientific and FEI TEM systems that are equipped with a compatible camera. See the release specific chapters below for a specification of the supported TEM Server software versions and cameras.

## System, Software and Configuration Compatibility

The following tables show the compatible microscope software versions, the preferred EPU software versions per microscope software version, and the system configuration compatibility.

Although the EPU software is backward compatible with a limited range of microscope software versions, some of the new features and improvements may be available only for the most recent supported microscope software version(s).

### Preferred EPU Version per Microscope Software Version

Titan	Talos	Tecnai	EPU	Remarks
3.16 - 3.21	2.16 - 2.21	–	3.9	
3.15	2.15	–	3.8	
3.14	2.14	–	3.7	
3.13	2.13	–	3.6	Falcon C support added.

Titan	Talos	Tecnai	EPU	Remarks
3.12	2.12	–	3.5	
3.11	2.11	–	3.4	
3.10	2.10	–	3.3	
3.9	2.9	–	3.2	
3.8	2.8	–	3.1	
3.7	2.7	–	3.0	
3.11	2.11	–	2.14	
3.5	2.5	–	2.13	
3.4	2.4	–	2.12.1	
3.3	2.3	–	2.11	
3.2	2.2	–	2.10	
3.0 - 3.1	2.0 - 2.1	–	2.9	
2.15	1.15	–	2.12.1	
2.14	1.14	–	2.8.1	
2.13	1.13	–	2.7	
2.12	1.12	–	2.6.1	
2.6 - 2.11	1.6 - 1.11	5.6 - 5.7	1.12	Last release for Falcon II.
2.0 - 2.5	1.1 - 1.5	–	1.7	
1.6	–	4.6.4	1.6	Last release for Windows XP.

## Compatible Microscope Software Versions per EPU Version

EPU	Titan	Talos	Remarks
3.9	3.16 - 3.21	2.16 - 2.21	
3.8	3.15 - 3.20	2.15 - 2.20	
3.7	3.14 - 3.19	2.14 - 2.19	
3.6	3.13 - 3.18	2.13 - 2.18	Falcon C support added.
3.5	3.12 - 3.17	2.12 - 2.17	
3.4	3.11 - 3.16	2.11 - 2.16	
3.3	3.10 - 3.15	2.10 - 2.15	
3.2	3.9 - 3.14	2.9 - 2.14	
3.1	3.8 - 3.13	2.8 - 2.13	
3.0	3.7 - 3.12	2.7 - 2.12	
2.14	3.6 - 3.11	2.6 - 2.11	
2.13	3.5 - 3.10	2.5 - 2.10	
2.12.1	2.15 3.4 - 3.9	1.15 2.4 - 2.9	<ul style="list-style-type: none"> <li>• Preferred over EPU 2.12.0</li> <li>• Most recent release that supports Windows 7.</li> </ul>
2.12.0	2.15 3.4 - 3.9	1.15 2.4 - 2.9	
2.11	2.15 3.3 - 3.8	1.15 2.3 - 2.8	
2.10	2.15 3.2 - 3.7	1.15 2.2 - 2.7	

EPU	Titan	Talos	Remarks
2.9	2.15 - 3.6	1.15 - 2.6	
2.8.1	2.14 - 3.5	1.14 - 2.5	Replaces EPU 2.8.0
2.8.0	2.14 - 3.5	1.14 - 2.5	<b>EPU 2.8.0 is withdrawn Do not install EPU 2.8.0</b>
2.7	2.13 - 3.4	1.13 - 2.4	
2.6.1	2.12 - 3.3	1.12 - 2.3	Preferred over EPU 2.6.0
2.6.0	2.12 - 3.3	1.12 - 2.3	
2.5	2.12 - 3.2	1.12 - 2.2	
2.4	2.12 - 3.1	1.12 - 2.1	First release for Windows 10
2.3	2.12 - 2.15	1.12 - 1.15	
2.2	2.12 - 2.14	1.12 - 1.14	
2.1	2.12 - 2.13	1.12 - 1.13	
2.0	2.12	1.12	Released only to Beta customers

## Compatible CryoFlow and EQM Versions per EPU Version

EPU	CryoFlow	EQM	Remarks
3.9	1.25	1.18	
3.8	1.24	1.17	
3.7	1.23	1.16	
3.6	1.22	1.15	Falcon C support added.
3.5	1.21	1.14	

EPU	CryoFlow	EQM	Remarks
3.4	1.20	1.13	
3.3	1.19	1.12	
3.2	1.18	1.11	
3.1	1.17	1.10	
3.0	1.16	1.9	
2.14	1.15	1.8	
2.13	1.14	1.7	
2.12	1.13	1.6	
2.11	1.12	1.5	
2.10	1.10	1.4	
2.9	1.9.2	1.3	
2.8	1.8.2	1.2	
2.7	1.8	1.1	First EPU release with DMP integration for: <ul style="list-style-type: none"> <li>• Falcon 3EC and Falcon 4</li> <li>• Gatan filters with Gatan K2 or K3 camera.</li> </ul>
2.6.1 and earlier	–	–	Not supported

## Compatible Cameras for EPU

Camera	Supported	Remarks
Ceta	Yes	<ul style="list-style-type: none"> <li>All Ceta Sensor Packages: 16M / -D / -S / -M / -F</li> <li>With and without Speed Enhancement (Ceta-2).</li> </ul>
Ceta-F	Yes	EPU 2.14 and later.
Falcon 4	Yes	EPU 2.6 and later.
Falcon 4i	Yes	EPU 2.14 and later.
Falcon 3EC	Yes	
Falcon I / II	No	EPU 1.12 and earlier.
Gatan Orius SC200 / SC1000	Yes	
Gatan OneView	Yes	
Gatan US1000 / 1000XP / 4000	Yes	

**Note:** The compatible cameras may not all be supported by the compatible microscope software versions. See the TEM Server Release Notes for a definitive list of supported cameras.

## Compatible Cameras and Energy Filters for EPU

Camera	Supported	Remarks
Selectris / Selectris X	Yes	Requires Titan 3.6 / Talos 2.6 or later.



Camera	Supported	Remarks
Gatan Enfinium SE / ER with US1000XP camera	Yes	
Gatan Quantum 963 / 964 / 965 / 966	Yes	
Gatan Quantum 967 with K2 camera	Yes	
Gatan BioQuantum 1967 with K3 camera	Yes	<ul style="list-style-type: none"> <li>• EPU 2.3 and earlier: only in stand-alone configuration.</li> <li>• EPU 2.4 and later: <ul style="list-style-type: none"> <li>• Embedded configuration is supported with: Titan 2.15.2/3 or 3.2 and later and Talos 1.15.2/3 or 2.2 and later.</li> </ul> </li> <li>• All other Titan and Talos versions: only in stand-alone configuration.</li> </ul>
Gatan BioContinuum 1069 with K3 camera	Yes	EPU 2.8 and later on systems with Titan 3.5 / Talos 2.5 or later.

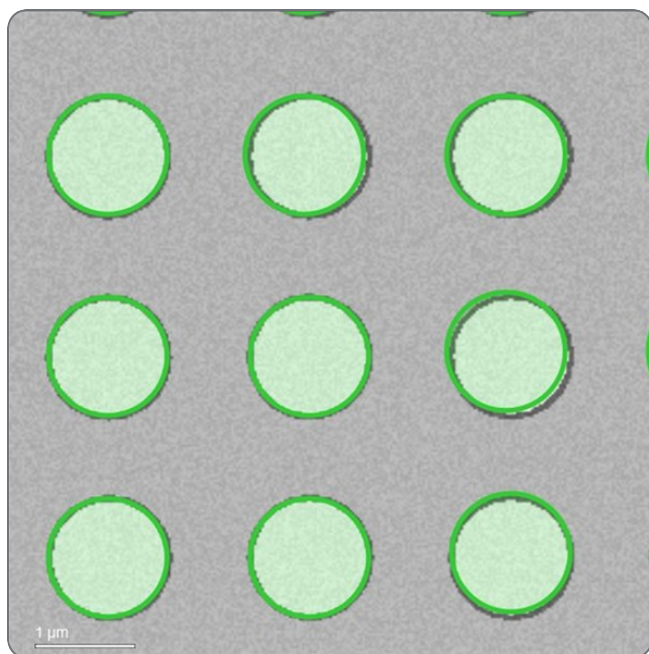
**i** **Note:** The compatible energy filters may not all be supported by the compatible microscope software versions. See the TEM Server Release Notes for a definitive list of supported energy filters.

## EPU 3.9.1

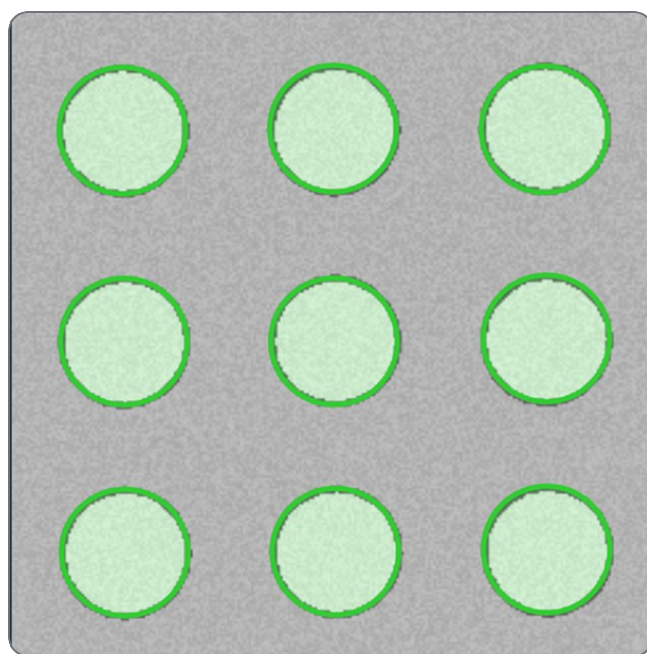
- SmartEPU is enabled by the new CryoFlow software, which serves as a successor to Athena software.
- Plasmon peak imaging works with embedded Gatan BioQuantum/BioContinuum filters.
- Embedded CryoSPARC Live multigrid support:
  - During a Multigrid session with a prepared single session using an Embedded CryoSPARC Live dataset, when the user:
    - Clicks on the **Auto-create sessions** button in the **Session Queue** task to create sessions for all slots.
    - Clicks on the **Add Session** button in the **Session Queue** task to create a single session.
  - Then the new session(s) have a dataset automatically created with the same parameters as the prepared single session.
    - Extraction Box Size
    - Min & Max Particle Diameter
    - Picking Shape
    - Particle Downsampling (Desired Approx. Pixel Size).

## Improvements

- When Prepare all, fails in one square, e.g. the eucentric fails then the procedure stops. Then it moves to the next square and the process does not stop.
- In the EPU tab, under the Hole Selection task, Find Foil Holes positions are now more accurate for grid squares of Quantifoil samples.



Before Improvement



After Improvement

## Known Issues

The following table lists the known issues that have emerged in this most recent release of EPU. For a comprehensive list, see [Known Issues](#).

ID	Issue Description and Workaround
NPD-6089	Autostigmat and Autocoma can fail because of missing pixel size. Workaround: perform calibrations including used magnification.

## Solved Issues

Besides the Solved Issues that are listed below, numerous smaller issues have been solved that were not listed as Known Issues for preceding releases.



ID	Issue Description
EPUAPI-3845	Plasmon peak imaging on K3 cameras : the energy shift does not revert to 0 eV for ZLP image, therefore both plasmon and ZLP images are with Energy Shift, just one is exposed with 10s and the other one is exposed with 1s.
EPU-14258	Autostigmatate and Autocoma fails, because the camera mode and the Align parameter selected by user is not used in these autofunctions.
EPUAPI-3593	Traffic lights popping up often during EPU session

# Known Issues

A large amount of effort is spent on adding and improving workflows and on continuous quality improvements.

Historic Known Issues that are solved in a released software version are not listed.

ID	Issue Description and Workaround
NPD-6089	<p>Autostigmat and Autocoma can fail because of missing pixel size.</p> <p>Workaround: perform calibrations including used magnification.</p>
EPU-14196	<p>During an Automated Acquisition run in EPU, when auto eucentric is running on the grid square and before foil holes are found, when <b>Skip Grid Square</b> is selected then the grid square is not skipped and <b>Skip Grid Square</b> and <b>Skip foil hole</b> buttons on the ribbon become disabled till the end of the automated acquisition run.</p> <p><b>Workaround:</b> In order to skip a grid square, it is advised to click the <b>Skip Grid Square</b> button after foil holes are found on the grid square.</p>
EPU-14224	<p>When the option <b>Close column valves</b> is set before starting an EPU session, the column valves will close as expected after finishing the run. <b>If the check mark is only selected during a running EPU session</b>, the valves will not close after the EPU run is finished, independent of the check mark setting.</p>
	<p><b>Workaround:</b> It is advised to select <b>Close column valves</b> option before starting the data acquisition or manually close the column valves.</p>

ID	Issue Description and Workaround
EPU-14221	<p>The smart plugin <b>Stage Settling Time Predictions</b> is disabled when Fast mode is enabled in an EPU session. However, the tooltip for this plugin when Fast mode is enabled provides a misleading message as it indicates that it is disabled due to Tilted acquisition:</p> <div data-bbox="467 499 868 703" style="border: 1px solid black; background-color: #333; color: white; padding: 5px; margin: 10px 0;"> <p><b>Stage Settling Time Predictions</b>                      Smart Plugins are not available when Tilted Acquisition is enabled. To use Smart Plugins, disable Tilted Acquisition in the Session Setup Task.</p> </div>
EPUAPI-2343	<p>Atlas Image Outdated in Calibrate Image Shifts Task: This problem can occur if an Atlas session has been created, EPU is then shut down, and the sample is exchanged while EPU is still not running. In this scenario, the Atlas image loaded in the Calibrate Image Shifts task will not correspond to the current sample. Please note that this issue does not occur if the sample is exchanged while EPU is running.</p> <p>Ensure you exchange the sample while EPU is running; or, if the sample is exchanged with EPU shut down, reacquire the Atlas image.</p>
EPU-11489	<p>Hole centering may fail on Hex grids on Krios and Glacios systems when skipping a hole while using the Measure Hole Size  functionality. Skipping a hole or more is typically needed in Glacios systems where the beam diameter is larger than the Foil Hole.</p> <p>While this affects the usability of Automated Acquisition, there is no issue with:</p> <ul style="list-style-type: none"> <li>• Manual selection of holes.</li> <li>• Automatic selection using Measure Hole Size  for the purpose of Fast Screening rather than Acquisition.</li> </ul>

ID	Issue Description and Workaround
EPU-10595	License activation link is broken.
	Manually visit the URL <a href="https://manual.bprotected.nl/activation.aspx?pub=Thermo+Scientific">https://manual.bprotected.nl/activation.aspx?pub=Thermo+Scientific</a> .
EPU-10230	Automatic alignments do not prepare system for acquisition in MicroProbe mode.
	MicroProbe mode is not aligned automatically. In order to acquire data in MicroProbe mode, the system must be aligned manually from PEOUI.
EPU-9718	When the Chrome browser is not installed, the CryoFlow shortcuts in EPU might not work.
	Install the Chrome browser or navigate to CryoFlow manually.
EPU-7203	When previewing fractions in EPU, other applications cannot use the camera.
	In EPU, navigate to another tab or task to release the camera.
EPU-6334	After executing the template in <i>EPU &gt; Template Execution</i> , there is no way to inspect the acquired images. The acquired images are displayed during execution, but an acquired image is removed from the display as soon as a new image is acquired.
	Not available
EPU-4002 EPU-3693	Camera names and/or microscope settings are incorrect after a camera upgrade from Gatan K2 to Gatan K3.
	<ul style="list-style-type: none"> <li>• Stop EPU</li> <li>• For all user-accounts, delete the <i>EFTEM_MicroscopeSettings.xml</i> file in the <i>%appdata%\Thermo Scientific\EPU\Parameter\</i> folder.</li> </ul>

ID	Issue Description and Workaround
<p><b>TT115829</b></p>	<p>Throughput issue when using K2 on BioQuantum. Calls to the energy filter can add significant delays. These can happen when switching between data acquisition and foil hole acquisition or between data acquisitions, depending on which function creates the problem.</p>
	<p>Reset the camera and GMS. If that does not help, then reboot the Gatan PC.</p>
<p><b>TT121858</b></p>	<p>If the Atlas session folder is moved or renamed, then it is not possible to manually load an Atlas. In the EPU User Interface, a critical error appears that the Atlas.dm file may be corrupt.</p>
	<p>Close EPU, restore the Atlas session folder path, start EPU, and try again.</p>