

Selectris and Selectris X Imaging Filters

Experience the thrill of atomic-resolution cryo-EM

Designed for stability and speed, the Thermo Scientific™ Selectris™ and Selectris X Imaging Filters are post-column imaging filters that improve the contrast of TEM images, resulting in high-resolution structures up to atomic resolution.

The zero-loss filtering of the Selectris Filters removes noise caused by inelastically scattered electrons, producing an increased signal-to-noise ratio (SNR). This is a benefit not only for relatively thicker cryo-electron tomography samples, but also for thin samples used in single particle analysis (SPA), where a strong contrast enhancement is observed. Designed for high stability, ease of use, and paired with the latest generation Thermo Scientific Falcon 4i Direct Electron Detector, Selectris Filters enable you to obtain high-resolution structures quickly for novel biological insights.

Cryo-electron microscopy (cryo-EM), the imaging of biological molecules suspended in a thin layer of vitrified water, is often challenging as radiation damage inevitably restricts the electron dose that can be applied. This, in turn, results in long acquisition times, unless contrast can be enhanced otherwise.

Zero-loss energy filtering provides a means to improve image SNR, resulting in enhanced contrast, higher resolution reconstructions and increased throughput. This can lead to new biological insights and allows further increases in cryo-EM workflow productivity.

With the Selectris Filters, zero-loss energy filtering is straightforward due to the thorough integration of software and hardware along with extensive automation and exceptional stability. Every mechanical and electron-optical element has been designed for stability and reproducibility, enabling the unattended and reliable acquisition of large datasets with narrow energy slit widths (<10 eV). Particularly for the thin samples often used in SPA, the capability to use <10 eV slits provides an additional boost in contrast, enhancing signal strength, resolution and throughput.

Key Benefits

Designed for stability

- Contrast enhancement on thin and thick samples thanks to <10 eV zero-loss energy-filtered transmission electron microscopy (EFTEM)
- Sophisticated aberration correction, low image distortions, and uniform energy resolution over entire field of view
- Minimized sensitivity to temperature variations

Straightforward operation

- Fully integrated in Thermo Fisher Scientific instrument operation software as well as Thermo Scientific EPU and Tomography Software for data collection
- Filter tuning is only needed occasionally and is completely automated
- No need to interrupt data collection for zero-loss centering

Falcon 4i Direct Electron Detector

- High throughput for more images per hour
- Unsurpassed imaging quality with high DQE
- Lossless data compression with patented Electron Event Representation (EER)

The Selectris Filters are paired with the latest generation Thermo Scientific Falcon™ 4i Direct Electron Detector and are fully integrated into the instrument's operation and application software. Selectris Filters are available on the award-winning Thermo Scientific Krios™ and Glacios™ Cryo-TEMs.

Selectris X Filter – taking the next step toward atomic resolution

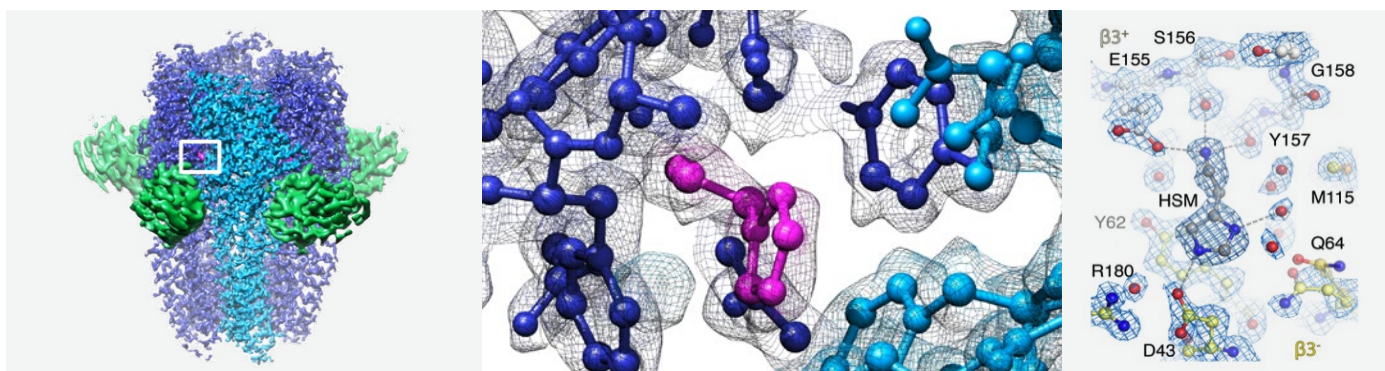
Expanding on the stability, ease-of-use, and performance of the Selectris platform, the Selectris X Imaging Filter offers an even more sophisticated electron optical system for further aberration correction. This results in extremely low distortion characteristics in both the image and energy domains, opening the way to true atomic-resolution structures in single particle analysis cryo-EM.

System requirements

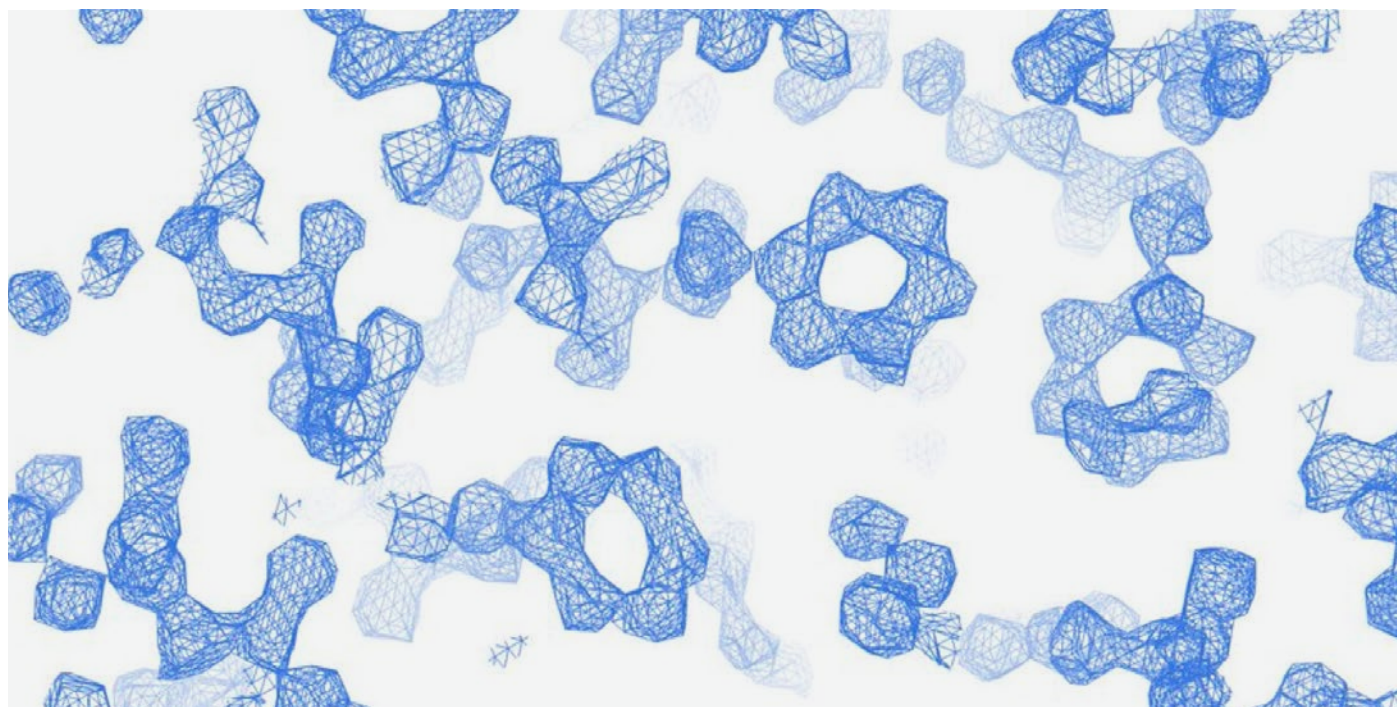
Compatibility: Selectris and Selectris X Filters are available on new Krios and Glacios Cryo-TEMs. Retrofits to existing microscopes are possible on most Thermo Scientific cryo-TEMs operating under Windows 10.



The Thermo Scientific Selectris Imaging Filter.



GABAA receptor resolved at 1.7 Å shown from a side view (left). Detail of the binding pocket is shown in the middle. Histamine coordination and a number of water molecules (red spheres) are shown on the right. Adapted from Nakane, T. et al. Nature (2020), CC-BY 4.0. Image courtesy of Andrija Sente and Radu Aricescu, MRC-LMB Cambridge.



A 1.2 Å resolution reconstruction of apoferritin was created from 3,600 images of 297k particles acquired in 6 hours (EPU data was acquired on the Thermo Scientific Krios G4 Cryo-TEM). Recorded at a dose rate of 5.4 e/p/s.

Learn more at thermofisher.com/Selectris

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