Electron Dose Control Module

Control dose as quickly and easily as changing the image focus

An increasingly wider diversity of specimens is being investigated with transmission electron microscopy, making it more important than ever to quickly and easily set an appropriate electron dose to suit your particular samples and experiments.

Accurately set the dose where it is important – at the specimen

Electron Dose Control (EDC) from Thermo Fisher Scientific is an optional control module for Thermo Scientific™ Spectra™ Transmission Electron Microscopes (TEMs) equipped with an extreme cold-field emission gun (X-CFEG). With EDC, you can:

- Know the dose and dose rate at the specimen and accurately set it
- Recall dose settings from previous experiments
- Track changes in the dose, live, as acquisition parameters are adjusted
- Know the dose that will be used to collect the final image before the acquisition even begins

Setting and accurately knowing the dose at the specimen enables better reproducibility between experiments on different days and on different systems. Specimens are also better preserved when the right dose is used the first time. EDC also simplifies scanning transmission electron microscopy (STEM) acquisition parameters.

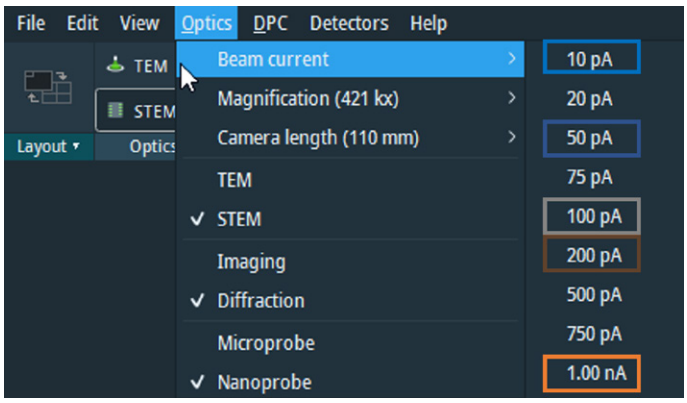

Figure 1. Beam current selection menu. The Electron Dose Control menu gives you accurate control over the beam current and dose to be delivered to the specimen.

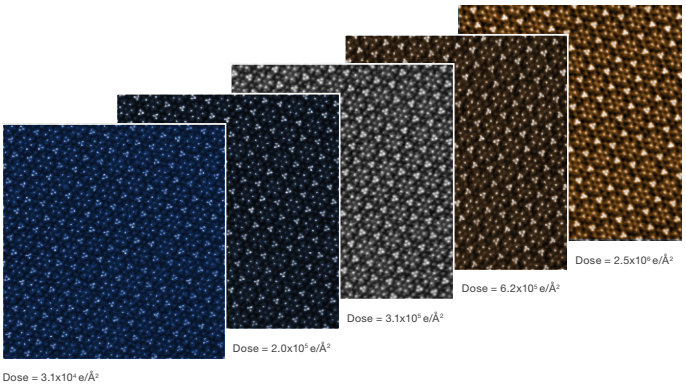

Figure 2. A garnet specimen ($GdGaO_3$ <111>) imaged with high-angle annular dark field (HAADF) detector at 300 kV with an X-CFEG. EDC can control the dose at the specimen over a dose range that spans two orders of magnitude. Optimum imaging conditions, magnification, number of pixels, and dwell time are all maintained throughout the experiment.

Adjust the dose over orders of magnitude while maintaining atomic resolution

EDC leverages the reproducible, constant power optics and precise stacking of condenser lens modules on Spectra platforms to maintain atomic-resolution imaging conditions in STEM while the gun lens and spot sizes are adjusted over their full range.

This gives you the ability to change the dose over a wide range while maintaining sub-Å resolution, with just a single click of the mouse. The dose can then be quickly adjusted to accommodate beam-sensitive specimens or different applications with different dose requirements.

Since EDC keeps the image in sharp, atomic-resolution focus over different dose settings, less dose is spent setting up the experiment and more dose can be spent on the final acquisition to collect higher quality data with a better signal-to-noise ratio.

Available on all Spectra platforms equipped with an X-CFEG

EDC is an option for all Spectra platforms equipped with an X-CFEG. The X-CFEG is a perfect match for EDC since its extreme brightness provides sub-Å probes even with >1 nA of probe current. Together, they allow you to image across a huge range of doses without the image resolution being affected.

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