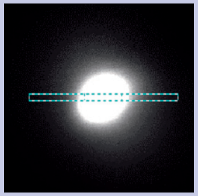
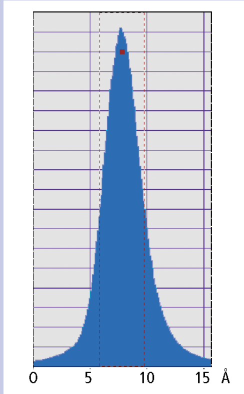
No Spot Dispersion

Entrance spot size



dFWHM ~ 0.47 nm



Line profile of entrance spot

MC Entrance plane

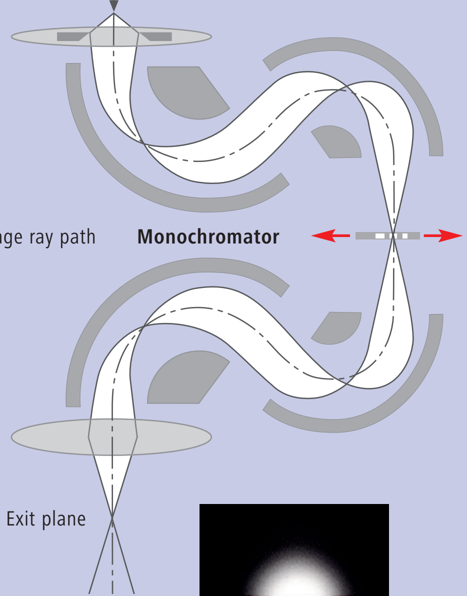
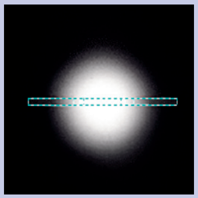


Image ray path **Monochromator**

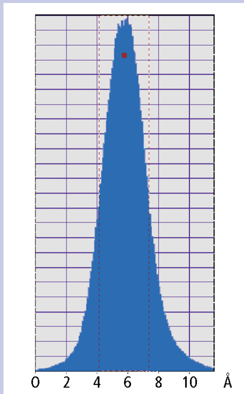
Piezo driven slit aperture at dispersive plane

MC Exit plane

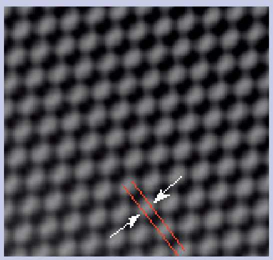
Exit spot size



dFWHM ~ 0.5 nm



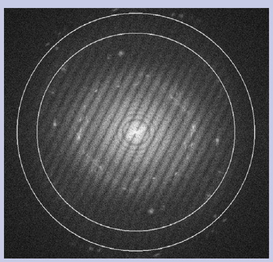
Line profile of exit spot



The monochromator preserves the spot size and angular energy distribution of the source. The symmetric hexapole fields also cancel 2nd order aberrations to yield minimum loss of brightness.

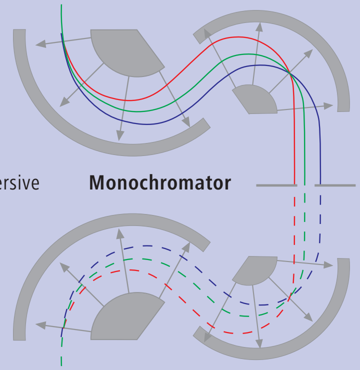
A preserved spot size allows MC STEM imaging at maximum brightness for all energy widths, which is not possible with dispersive MC designs.

At left is a <110> Si direction MC STEM image resolving the 0.136 nm dumbbells.



Because the temporal coherence is also improved the information limit is extended while using the monochromator in TEM mode, as represented by the inset diffractogram of Au showing resolution of 0.12 nm (inner ring) and 0.10 nm (outer ring) on a Cs probe corrected LIBRA® MC.

High Energy Dispersion



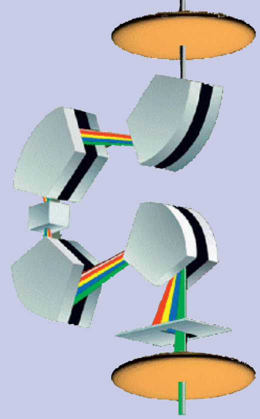
Energy dispersive ray path

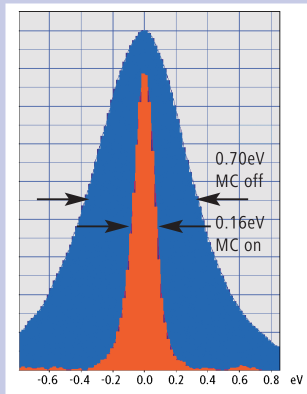
Monochromator

Slit aperture in dispersive plane

Electrons with an energy spread of < 0.2 eV exit the MC and enter the condenser optics enroute to the specimen

Energy filter

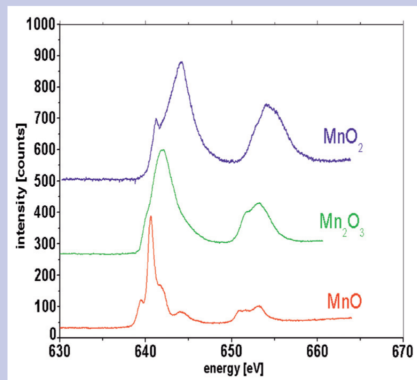




After passing through the specimen the electrons pass through the corrected OMEGA energy filter. No longer limited by the source, the energy filter produces improved spectral energy resolution as shown below.

The OMEGA-type monochromator in combination with the corrected OMEGA energy filter allows spectroscopy with an energy dispersion of 0.2 eV and with a spatial resolution of less then 0.14 nm.

Results yield chemical, structural and electronic information at high spatial and high energy resolution.



Manganese oxide chemistries resolved by 0.2eV EELS