

SEMINAR

Novel atomic-resolution scanning transmission electron microscopy imaging using a “segmented annular all field” detector

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Abstract



In scanning transmission electron microscopy (STEM), a finely focused electron probe is raster scanned across the specimen and the transmitted and/or scattered electrons from a localized material volume are detected by the post specimen detector(s) as a function of raster position. STEM image contrast characteristics can be manipulated by controlling the detector geometry. Several imaging modes such as bright-field, low-angle annular dark-field, high-angle annular dark-field and the recently developed annular bright-field have been devised, and are now utilized in many fields. Recently, we have developed a new area detector – dubbed the SAAF (“segmented annular all field”) detector – which is capable of atomic-resolution STEM imaging [1]. This new area detector can obtain 16 simultaneous atomic-resolution STEM images which are sensitive to the spatial distribution of the scattered electrons in the detector plane. This capability can be used for exploring novel imaging techniques such as atomic-resolution differential phase contrast imaging [2]. Details of the detector system and some application results will be discussed.

[1] N. Shibata, S.D. Findlay *et al.*, *J. Electron Microscopy* **59**, 473 (2010).

[2] N. Shibata, S.D. Findlay *et al.*, *Nature Phys.*, **8**, 611-615 (2012).

Convenors: Professor Joanne Etheridge, MCEM
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