

You are cordially invited to a

Susi group virtual seminar

on Wed, January 19 at 16:00

taking place on Zoom:

<https://univie.zoosm.us/j/93334009384?pwd=S3JUSzZ2N25hZW1JKzZTbVZnQ2o2Zz09>

(Meeting ID: 933 3400 9384, Passcode: 125601)

with visiting professor

J. Murray Gibson

on sabbatical at University of Vienna Faculty of Physics

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talking about

Characterizing order in amorphous materials with fluctuation electron microscopy

Most of what we know about the structure of amorphous materials is limited to the pair correlation (or radial distribution) function. The existence of ordering on a medium length scale (~10 bond lengths) is poorly understood, yet likely of major importance to properties of amorphous materials. Direct imaging of atomic structure in amorphous materials is possible, but challenging even in the 2D limit,^{1,2} and the need to examine statistically significant numbers of atoms makes this approach impractical. Instead, the technique of fluctuation electron microscopy³ offers a powerful complementary solution.

I will review the method, which relies on statistical analysis of coherent nanobeam electron diffraction patterns, and demonstrate its sensitivity to higher order atomic correlations and medium range order. In my own work I have primarily studied the structure of amorphous Si, but I will also discuss the work of many other groups on other materials, and developments in the techniques.

Finally, I will consider future developments in the fluctuation microscopy technique and the potential for broader application to amorphous and disordered materials.

References:

1. P.Y. Huang *et al.*, Nano Lett. **12** (2) 1081–1086 (2012)
2. J. Kotakoski *et al.*, Phys. Rev. Lett. **106**, 105505 (2011)
3. M.M.J. Treacy, J.M. Gibson, Acta Crystallographica A, **52**, 212-220 (1996)

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