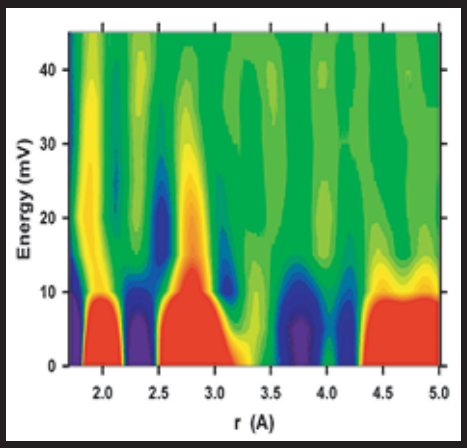
Takeshi Egami

"Seeing the Real Atomic Correlation in Matter: Dynamic and Static PDF Methods"

Takeshi Egami is currently a Professor and Distinguished Scientist at the University of Tennessee and Oak Ridge National Laboratory, respectively. He pioneered the development and use of the pulsed neutron pair-density function (PDF) analysis method. Its application to disordered crystals earned him the prestigious B. E. Warren Diffraction Physics Award of the American Crystallographic Association (2003). He is a former Professor and Department chair of Materials Science and Engineering at the University of Pennsylvania, and a Fellow of the American Physical Society.



Dynamic PDF of $Pb(Mg_{1/3}Nb_{2/3})O_3$ determined with the PHAROS of LANL.

Bragg's law is an ultimate magic, because it reduces the positions of 10^{23} atoms to just a few numbers. This, of course, is a lucky consequence of translational symmetry. Unfortunately, we are not always lucky with many materials that are important today, including ourselves (biological matter), since they (and we) are not crystalline, or only poorly crystalline. But it is possible to see, more or less directly, the real atomic correlations in these disordered matters by using the method of atomic pair-density function (PDF) analysis using neutron or x-ray scattering. Due to advances in instrumentation we now can determine the PDF up to 20 nm, and see even the dynamics of correlation by the dynamic PDF method. This talk will address some examples of how this approach facilitates understanding of complex matter, and where the field may be heading.

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