

STRUCTURE AT THE NANOSCALE: ATOMIC PAIR DISTRIBUTION FUNCTION ANALYSIS OF NANOSTRUCTURED MATERIALS

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Traditional crystallography struggles when atomic order persists only on the nanoscale; the so-called nanostructure problem. The atomic pair distribution function (PDF) technique is not the only approach to address this, but is proving to be surprisingly powerful a tool in the nanotechnologist's toolkit.

In this talk I will briefly review recent developments in the method, focussing on data collection and modelling, and describe some scientific examples where it has resulted in some critical insight that was not available before. The range of materials where the method can be applied is broad, ranging from minerals, through synthetic inorganic materials, all the way to molecular systems such as pharmaceuticals. With the advent of powerful new sources of high energy X-rays and neutrons, coupled with fast computing and rapidly developing algorithms and software programs, it seems inevitable that this method will remain a powerful tool for many years to come.