Exploring total scattering in 3D volumetric space

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The intriguing relationship of microscopic structure to macroscopic physical and chemical properties has been studied by diffraction methods with increasing depth. Conventional single crystal diffraction has exploited the information derived from Bragg structure refinement to the finest details.

Recently, mapping the full volume of three-dimensional reciprocal or diffraction space instantaneously and with high resolution is being explored. This grants unprecedented access to diffraction data by simultaneously measuring the fully periodic and only locally ordered diffraction contributions simultaneously.

Keen and Goodwin[1] have recently reviewed correlated disorder showcasing current capabilities and challenges. Expanding total scattering and local structure analysis into 3 dimensional space is an exciting development to reveal local ordering phenomena in specific lattice planes.

[1] Keen, D.A., Goodwin, A.L. (2015) Nature, 521, doi:10.1038/nature14453.