

## **X-ray scattering: a powerful probe of lattice strain in materials with small dimensions**

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X-ray diffraction was recognized from the early days as very sensitive to atomic displacements. Indeed structural crystallography has been very successful in locating with great precision the position of atoms within an individual unit cell. In disordered systems it is the average structure and fluctuations about it that may be determined. In the field of mechanics diffraction may thus be used to evaluate elastic displacement fields. I will give examples from recent work where x-ray diffraction has been used to investigate average strains in lines, films or multilayers. In small objects the proximity of surfaces or interfaces may create very inhomogeneous displacement fields. X-ray scattering is again one of the best methods to determine such distributions. The need to characterize displacement fields in nanostructures together with the advent of third generation synchrotron radiation sources has generated new and powerful methods (anomalous diffraction, coherent diffraction, micro-diffraction, ...). I will review some of the recent and promising results in the field of strain measurements in small dimensions via X-ray diffraction.