

Insight Into the SANS Resolution and Instrumental Smearing

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Small-Angle Neutron Scattering (SANS) is a technique of choice for the characterization of nanoscale structures. This technique has grown to a sophisticated level with better instrumentation and advanced methods for data reduction and analysis. Desmearing of the data or smearing of the analysis models used to perform nonlinear least squares fits require detailed knowledge of the resolution function. The SANS resolution has been worked out in some detail [1-4] and will be presented for a number of cases corresponding to various instrumental conditions. The effect of gravity for long neutron wavelength and long flight paths will be discussed. Gravity modifies the iso-intensity contour plots from circular to elliptical close to the beamstop. Configurations that include neutron focusing refractive lenses and gravity correcting prisms will also be presented. Thorough formulation of the variance of the Q resolution and of the minimum scattering variable Q_{\min} will be summarized.

References

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