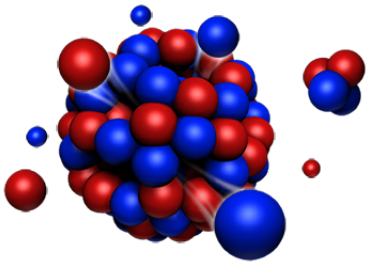

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Combining Simulation and Measurement to Understand Complex Detector Geometries

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In order to make use of the high neutron flux expected at the European Spallation Source, alternatives to ^{3}He based detectors are required. Furthermore, to maximise the benefit of the time-of-flight method, instruments at ESS will make use of a wide angular coverage of detectors. The LoKI SANS instrument is being developed in a collaboration between ESS and STFC and will make use of ^{10}B based Boron Coated Straws from Proportional Technologies Inc.

In order to obtain acceptable efficiencies, these detectors consist of 7 boron coated copper tubes packed within a 1"aluminium tube, with each copper straw wired as a position sensitive detector. On LoKI, these 1"aluminium detector tubes will then be packed into arrays to make detector panels which will be placed in 4-panel banks around the beam at ~1.3 m and ~4 m from the sample, and a single panel bank on a carriage which will move between ~5m and 10 m from the sample.

The arrangement of the detector tubes and straws within each panel, combined with the placement of the detector banks, creates a complex detection geometry that presents challenges for calibration and normalization. To address this we are undertaking a combination of experimental measurements with detector prototypes, and simulations of the detector system using McSTAS and GEANT4.

Here we present our progress towards developing the detector calibration and data processing scheme for LoKI.

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