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Round Robin Sample for Neutron Reflectometry

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Were a scientist to visit one of the many neutron and X-ray reflectometers in use around the world (s)he would hope that if the same sample were measured on any of those instruments the results from the experiment would be comparable and reproducible. Each user measurement relies on many assumptions, including: good calibration of the instrument, valid measurement processes, valid data reduction algorithms, good knowledge of resolution functions, etc. It would be unfortunate if data measured across a class of instruments were not comparable and reproducible as a large body of research into interfaces is underpinned by these techniques. The small-angle neutron scattering community investigated this recently, with a series of round robin measurements of a common sample at different facilities, spanning a range of instruments with different design characteristics. This round robin was able to verify the performance and reliability of the instruments taking part, as well as highlighting areas for improvement (in data reduction, or instrumental resolution functions, for example). Analysis of the data requires a deep understanding of the resolution as the resultant model parameters can be affected if this is not well known. This dependence illustrates the value of the round robin comparison - the same sample should give the same output parameters, even if measured on different instruments. We have therefore decided to initiate a similar process for neutron and X-ray reflectometers. This talk outlines the progress of the project so far.