**Advanced visualization and quantification of neutron data**

Toby Perring1, Owen Arnold2, Michael Reuter3, Janik Zikovsky3, Alex Buts1, Martyn Gigg2, Nick Draper2

1 STFC Rutherford Appleton Laboratory, Oxfordshire, UK

2 Tessella plc, Abingdon, Oxfordshire, UK

3 Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA

The VATES project is aimed at providing advanced tools for visualisation and fitting of parameterised models to huge neutron scattering data sets. Increasingly, a full understanding of the materials of interest to solid state physics, chemistry and materials research requires the complete mapping of data in an n-dimensional manifold. The dimensions of interest can be the either the modulus or the three components of momentum transfer, energy transfer, and in addition the temperature, applied magnetic field, pressure or electric field.

The VATES project is an ongoing collaboration between ISIS at RAL and the SNS at Oak Ridge. The project has been run in parallel to Mantid[1], our extensible framework for neutron and muon data reduction and analysis.

The core of the project has been heavily focused on creating and manipulating n-dimensional data, and extending the Mantid suite of algorithms to operate on this new format.

The major user applications that have been created so far provide full 3D visualisation of manifolds within the n-dimensions, and provide new opportunities for data discovery and reduction. By using ParaView[2] as the visualisation engine, we are able to provide detailed and flexible representations of the data. Two-way interaction between ParaView and Mantid allows us to view data as it exits Mantid, and also visually drive Mantid, allowing us to perform tasks such as on-the-fly re-binning of data.

The project focus is now shifting towards simulation and fitting of parameterised models of n-dimensional data, for which we have been able to draw on expertise and proven tools from both ISIS and the SNS as well as the technology already implemented in the earlier phases of VATES.

**References**

[1] [www.mantidroject.org](http://www.mantidroject.org)

[2] [www.paraview.org](http://www.paraview.org)

Email corresponding author: toby.perring@stfc.ac.uk Preference: Oral

Key theme: High speed/real time data analysis/visualisation/3D graphics