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**Title (plain text only):** Neutron imaging using the Mantid framework

**Title (formatted text):** Visualisation and Analysis in VATES for Single Crystal Neutron Diffraction

The VATES (Visualisation and Analysis Tookit ExtensionS) sub-project, within the Mantid1 program has been aimed at advancing the framework to better analyse and visualise n-dimensional data. Large neutron scattering datasets are commonly collected and generated at TOF sources. Furthermore, a full understanding of the materials of interest often requires the complete mapping of data in an n-dimensional manifold. Increasingly, the correct treatment of data as part of data reduction and analysis, for a range of techniques, involves the efficient and flexible processing of large n-dimensional datasets.

The tools developed as part of the VATES project are incorporated and distributed with Mantid, our extensible framework for neutron and muon data reduction and analysis. The VATES project is an on-going collaboration between ISIS at RAL, SNS at Oakridge and the ESS in Lund.

Although the developments in VATES span the needs of several techniques, particular effort has been applied to improving processing for single crystal neutron diffraction, for which a large portion of the data treatment is performed in momentum transfer space.

Using a mixed team of instrument scientists and software engineers, we have implemented many of the key features to solve complex problems within the data reduction. For example, providing efficient sparse data representation in n-dimensional space and allowing n-dimensional algorithms to operate on them.

Recently introduced normalisation, integration and visualisation techniques provide significant improvements to the functionality and end-user experience.

**References**

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