

## Advanced visualization and analysis of neutron data

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The VATES project is a collaborative effort aimed at delivering advanced tools for visualisation and analysis 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.

Originally developed as an extension to Mantid<sup>[1]</sup>, the VATES project is now fully integrated within Mantid, our neutron and muon data reduction and analysis framework. The project receives support and enhancements from both ISIS at RAL and the SNS at ORNL.

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. Our approach allows us to take account of the sparse nature of data, ensuring efficient storage and processing where possible.

VATES provides new opportunities for data discovery and reduction. By using ParaView<sup>[2]</sup> as the visualisation engine, we are able to construct complex pipelines and provide detailed and flexible representations of the data. Two-way interaction between ParaView and Mantid allows us to offload processing to Mantid, in effect, visually driving it. Our Mantid framework additions have provided unexpected opportunities for new methods of visualising and processing data, such as single crystal peak integration.

We are now striving to develop better usability, better end-to-end integration, and continue to extend the tools and techniques for other facilities and scientific areas.

### References

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

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