

Neutron and X-ray Diffraction: Complementary Methods for Structure Solution

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Single crystal diffraction has been used as a tool for structure analysis since the discovery of neutron scattering. Complementary to X-ray radiation neutron radiation is most sensitive to detect 'light' elements. Hydrogen can be located precisely next to 'heavy' metals and elements in atomic and molecular structures. Due to lower flux energies neutron diffraction is the gentle probe to study structures with organic content. A major obstacle of current instrumentation is the moderate flux and therefore the significantly larger sample sizes and extended data collection times.

A major objective for the new diffraction instrument, TOPAZ, currently under construction at the Spallation Neutron Source (SNS), Oak Ridge National Laboratory, is to employ efficient neutron beam transport systems. This time-of-flight Laue diffractometer will be designed to accommodate X-ray size samples and shorten exposure times significantly.