Advances in Neutron Single Crystal Diffraction towards a Smaller Sample Sizes

<u>Christina Hoffmann</u>^a, Alexandru Stoica^a, Arthur Schultz^b, Paula Piccoli^b, Robert Bau^c, Thomas Koetzle^b, ^aSpallation Neutron Source Oak Ridge National Laboratory, USA. ^bIntense Pulsed Neutron Source, Argonne National Laboratory, USA. ^cDepartment of Chemisty, University of Southern California, Los Angeles, USA. Email: hoffmanncm@ornl.gov

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 especially useful to locate 'light' elements like hydrogen next to 'heavy' elements like metals. Furthermore, neutrons are much "gentler" to organic crystals. A major obstacle for neutron diffraction is the moderate flux and therefore the significantly larger single crystal sizes and longer data collection times needed for a decent data set.

A major objective for the single crystal diffraction instrument currently under construction at the Spallation Neutron Source (SNS), ORNL, is to make extensive use of beam transport and focusing optics. This time-of-flight Laue diffractometer will implement a super mirror beam guide following the trace of a parabolic curve in a piecewise approximation [1]. In this context micro-focusing optics under development for neutron scattering applications are also being reviewed and recently collected data from prototypical assemblies and setups are being presented.

[1] Stoica A.D., Wang X.-L., Lee W.-T., Richardson J.W., in *Advances in Computational Methods for X-Ray and Neutron Optics, Denver*, 2004, Proceedings of SPIE Vol. **5536**, p. 86.

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