Science during a pandemic – remote access to neutron diffractometers

M. Kirkham1, R. Benson1, R. Crompton2, M. Everett1, L. Grace1, P. Parker2, H. Skorpenske1, J. Thomson1, K. Vodopivec1, J. Werner3, A. White3

1Neutron Sciences Directorate, 2Information Technology Services Division, 3Environment, Safety, Health and Quality Directorate, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 37831 USA

kirkhammj@ornl.gov

Keywords: neutron diffraction, remote experiment, facility access, instrumentation

The neutron sources at Oak Ridge National Laboratory (ORNL), namely the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS), have for many years attracted scientists from all over the world to perform neutron scattering research. That ground to a halt in 2020 when the global pandemic restricted the ability of researchers to travel to the facility. Though SNS soon restarted in a limited way to conduct coronavirus-related research, a more structured approach was needed to return to full operation. Therefore, the Neutron Sciences Directorate instituted a Remote Experiment Task Force to implement remote access to instruments at both neutron sources. Remote experiments are distinguished from already-existing mail-in programs primarily by allowing users to remotely control the instruments, and such access was eventually implemented across almost all instruments and experimental setups. Additionally, automation and communication tools were developed to improve workflows. These developments allowed the neutron sources to maintain high levels of productivity even with restricted on-site access by users. The availability of remote experiments has many benefits, including increased accessibility to neutrons for those whose ability to travel is restricted due to financial, family, health or other limitations. However, remote experiments also have drawbacks that must be considered, such as difficulty training new users remotely and increased workload on instrument staff to handle all the hands-on tasks for the experiment. That said, the benefits outweigh the drawbacks and remote experiments will continue to be part of the landscape of neutron scattering at ORNL going forward, even as pandemic travel restrictions are lifted.

Many hands at ORNL contributed to this work, including Ke An, YQ Cheng, Clarina Dela Cruz, Jaime Fernandez-Baca, Garrett Granroth, Christina Hoffman, Bradley Horn, Rob Knudson, James Kohl, Bhargavi Krishna, Mark Lumsden, Kelly Mahoney, Gergely Nagy, Naresh Osti, Daniel Pajerowski, Jeff Patton, Shuo Qian, Toni Sawyer and Wei Tan. This research used resources at the High Flux Isotope Reactor and the Spallation Neutron Source, DOE Office of Science User Facilities operated by the Oak Ridge National Laboratory.