Contribution ID: **574** Contribution code: **SUP056** Type: **Poster Presentation**

Automation of sample alignment for neutron beamlines

Sunday 10 August 2025 15:00 (3 hours)

Neutron scattering experiments are crucial for the exploration of molecular structure in compounds. The HB-2A neutron powder diffractometer at the High Flux Isotope Reactor at Oak Ridge National Laboratory conducts magnetic studies of samples by illuminating them with different energy neutron beams and recording the scattered neutrons. Proper and consistent alignment of the sample is necessary to ensure that high quality data is collected throughout an experiment. This process is currently performed manually by beamline scientists. RadiaSoft, in collaboration with the beamline scientists and engineers at ORNL, has developed a reinforcement learning-based agent capable of aligning and isolating samples. We use a Q learning structure to train the agent. The agent identifies the method to move the sample to the center of the beam and the proper amount to close the neutron camera slits. We then move the sample and close the slits using a custom Python-based EPICS IOC interfaced with the sample and slit motors. In this paper, we provide an overview of our reinforcement learning tools and show our results aligning samples like those at ORNL.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

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I have read and accept the Privacy Policy Statement

Yes

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