



Contribution ID: 330

Type: **Poster**

Virtual experiments at the KWS-1 instrument with VITESS to assist training of machine learning algorithms

Monday, 20 March 2023 16:00 (2 hours)

VITESS [1] is a Monte Carlo based simulation package for neutron ray-tracing now hosted by the Forschungszentrum Jülich. We show the VITESS simulation results of the KWS-1 Small Angle Neutron Scattering (SANS) instrument at the FRM-II research reactor and compare them with experimental measurements. With the instrument correctly simulated, it is possible to generate a synthetic database of enough size for machine learning algorithm training tasks, which would be difficult otherwise to obtain due to long measurement times in Small Angle Neutron Scattering experiments. In this work we show the potential of this approach and discuss its advantages and disadvantages.

[1] C. Zender, K. Lieutenant, D. Nekrassov, M. Fromme, ViteSS 3 –Virtual Instrumentation Tool for the European Spallation, J. Phys. Conf. Ser. 528 (2014) 012036.

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Session Classification: Poster Session MONDAY

Track Classification: Neutron Instrumentation, Optics, Sample Environment, Detectors, and Software