Contribution ID: **263** Type: **Poster**

BEER@ESS: Versatile instrument for engineering studies

Monday 20 March 2023 16:00 (2 hours)

The time-of-flight engineering diffractometer BEER [1], which is under construction at the European Spallation Source (ESS), will offer new opportunities for investigations of engineering materials and components using a multi-scale approach and under near-processing conditions.
BEER combines the high brilliance of the ESS source with large instrument flexibility. The diffractometer includes a novel beam-shaping technique, the so-called modulation technique [2]. By a time-encoded extraction of several short pulses from the long ESS pulse, a substantial intensity gain of up to an order of magnitude compared to a pulse shaping method (one pulse extraction) for high-crystal-symmetry materials can be achieved without compromising the resolution. More complex crystal symmetries or multi-phase materials can be investigated by the standard pulse shaping method. The variable chopper set-ups and advanced extracting techniques [3] offer broad intensity/resolution ranges that can be adjusted for the experiment's needs. The combination of diffraction, small angle scattering, and even imaging techniques in quasi-simultaneous measurement opens a multi-scale investigation approach without the necessity to change the instrument.

[1] K.H. Andersen, et al., Nuclear Instruments and Methods in Physics Research Section A. 957 (2020) 163402.
[2] M. Rouijaa, et al., Nuclear Instruments and Methods in Physics Research, Section A. 889 (2018) 7-15
[3] J. Saroun, et al., J. Phys.: Conf. Ser. 746 (2016) 012011

Author: BERAN, Premysl (Nuclear Physics Institute CAS and ESS)

Co-authors: PERIC, Bojan (European Spallation Source (ERIC)); SIEMERS, Dirk Jan (Helmholtz-Zentrum Hereon); NOWAK, Gregor (Helmholtz-Zentrum Hereon); SAROUN, Jan (Nuclear Physics Institute of the CAS); FENSKE, Jochen (Helmholtz-Zentrum Hereon); BURMESTER, Joerg (Helmholtz-Zentrum Hereon); Prof. MÜLLER, Martin (Helmholtz-Zentrum Hereon); Dr LUKAS, Petr (Nuclear Physics Institute of the CAS); WORACEK, Robin (European Spallaion Source (ERIC)); KIEHN, Ruediger (Helmholtz-Zentrum Hereon)

Presenter: BERAN, Premysl (Nuclear Physics Institute CAS and ESS)

Session Classification: Poster Session MONDAY

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