



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

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