



Contribution ID: 1

Type: Poster

The Engineering Diffractometer BEER at ESS: A Status Update

Tuesday, 18 September 2018 17:15 (15 minutes)

The time-of-flight engineering diffractometer BEER currently under construction at the European Spallation Source (ESS) is dedicated to the support of the latest progress in development, fabrication and optimization of modern engineering materials by neutron scattering analysis. The main tasks of BEER are to enable fast *in situ* and *in operando* characterization of materials and their microstructure during processing conditions close to real ones and to provide state-of-the-art and fast analysis of residual stresses, microstructure/crystallographic texture characterisation and phase analysis.

These tasks are supported by a newly developed chopper technique called pulse modulation. It extracts several short pulses out of the long ESS pulse. Thus leading to a multiplexing of Bragg reflections and to substantial intensity gain for high symmetric materials while preserving the resolution.

By the combination of the new modulation technique with a standard pulse shaping technique, BEER is a versatile engineering diffractometer providing easy tuneable resolution/flux ratios across wide wavelength and resolution ranges. Together with a large detector coverage, BEER enables sub-second *in situ* measurements for fast residual strain scans; texture analysis as well as phase analysis of complex composite systems where high resolution is needed.

Here, we present an update of the BEER instrument design, its features and the current progress of the construction.

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Session Classification: Poster session 2

Track Classification: P1 Instrumentation and methods