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Crystof: A thermal spectrometer for HBS

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At JCNS we develop a technical design for a future high brilliance neutron source HBS. The very compact design of the neutron source allows to extract larger phase space volumes from the neutron moderators as compared to existing facilities, where the minimum distance between the moderator and extraction system and/or first choppers poses a significant constraint.

In this presentation we discuss a concept for a compact hybrid chopper spectrometer, that images the neutron source via a large crystal monochromator onto the sample. The monochromator provides a narrow wavelength resolution also for short wavelength, which is difficult to realize at long pulse and continuous neutron sources. The secondary wavelength is resolved by a chopper close to the sample and the time-of-flight to the detector, leading to the name “Crystof” for this spectrometer. The instrument is optimized for neutron energy loss scattering in the energy range between 10 and 100 meV resulting in a compact secondary spectrometer that allows large solid angle coverage at acceptable cost for the detector system. We will compare the performance of such a concept to existing thermal time of flight spectrometers.

This work is part of the collaboration within ELENA and LENS on the development of HiCANS.

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