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CSPEC- a cold time of flight spectrometer for the ESS

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The European Spallation Source (ESS) is expected to be the world's most powerful neutron source. Among the endorsed instruments foreseen for day one instrumentation at ESS, is the cold time-of-flight spectrometer CSPEC, collaboration between the Technische Universität München, and the Laboratoire Léon Brillouin. CSPEC will probe the structures, dynamics, and functionality of large hierarchical systems as they change or operate. Hierarchical systems include liquids, colloids, polymers, foams, gels, and granular and biological materials as well as the ever-complex low-energy dynamics of energy and magnetic materials. The unique pulse structure of the ESS with its long pulse duration (2.86 ms) and a repetition rate of 14 Hz requires new concepts for the instrumentation to make optimum use of the available source time frame. The energy resolution can be tuned in the range of $\Delta E/E = 6 - 1\%$, and CSPEC will utilize cold neutrons in the range from $\lambda = 2 - 20 \text{ \AA}$ with the focus on the cold part of the spectrum. The large detector area, with a radius of 3.5 m, $5 - 140$ degrees and 3.5 m in height, typical on a chopper spectrometer will be designed with optimal energy and Q resolution in mind while maintaining the highest signal to noise ratio. CSPEC is now in the detailed design phase, and we will present the current status and the expected performance.

Primary author: DEEN, Pascale (European Spallation Source ESS ERIC)

Co-authors: MOREIRA, Fernando (European Spallation Source ESS ERIC); LONGEVILLE, Stéphane (Laboratoire Léon Brillouin); LOAIZA, Luis (Heinz Maier-Leibnitz Zentrum (MLZ), Technische Universität München); FABREGES, Gregoire (Laboratoire Léon Brillouin); LOHSTROH, Wiebke (Heinz Maier-Leibnitz Zentrum (MLZ), Technische Universität München)

Presenter: LOHSTROH, Wiebke (Heinz Maier-Leibnitz Zentrum (MLZ), Technische Universität München)

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