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Progress of MIRACLES experimental activities, the backscattering spectrometer at ESS

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MIRACLES is the neutron backscattering spectrometer of the European Spallation Source [1]. The instrument will display a flexible tuning of the energy resolution, that allows exploration of a broad range of timescales, from the nanosecond to the picosecond, along with an unprecedented wide dynamic range and a versatile selection of energies for quasielastic and inelastic scattering experiments in the cold neutron range.

Our focus now is to describe how the scientific and technical requirements of the instrument are taking shape, with substantial progress in the development of design concepts for the neutron scattering components and experimental areas. Here, progress in the MIRACLES detector and data acquisition system, and evaluation of potential improvements in the analyzer system, that includes prototyping and testing measurements in the spectrometer IN16B at ILL, will be outlined. Furthermore, a description of the layout and ergonomics of the sample preparation areas will be detailed. These efforts will help to give final shape to the scattering system and the experimental station of the MIRACLES spectrometer.

[1] K. H. Andersen, et al., “The instrument suite of the European Spallation Source”, Nucl. Instrum. & Meth. A 957, 163402 (2020).

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