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Considering Instrumentation for a High Intensity Moderator at the European Spallation Source

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The European Spallation Source, currently under construction in Lund, Sweden, will originally make available a suite of 15 state-of-the-art neutron scattering instruments, which will be served by a high-brightness moderator placed above the spallation target. The current infrastructure of ESS, however, allows for a second, alternative moderator to be constructed and positioned below the spallation target. The second moderator is currently considered to have a larger viewable area, offering higher total cold neutron flux and higher intensities at longer wavelengths, potentially spanning a range from Cold (4–10 Å) to Ultra Cold (> 100 Å) neutrons. It is assumed that several areas of condensed matter research profit from such second moderator concept, including small-angle neutron scattering, spin-echo spectroscopy, and neutron imaging.

Here, we present the conceptual designs of potential instruments, giving focus to small-angle neutron scattering instrumentation. We make comparison of two conceptual designs, one having a conventional pin-hole geometry, optimized for the lower moderator, and the other making use of novel Wolter optics.

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