In-beam background suppression shield - DTU Orbit (09/12/2018)

In-beam background suppression shield
The long (3 ms) proton pulse of the European Spallation Source (ESS) gives rise to unique and potentially high backgrounds for the instrument suite. In such a source an instrument's capabilities will be limited by its Signal to Noise (S/N) ratio. The instruments with a direct view of the moderator, which do not use a bender to help mitigate the fast neutron background, are the most challenging. For these beam lines we propose the innovative shielding of placing blocks of material directly into the guide system, which allow a minimum attenuation of the cold and thermal fluxes relative to the background suppression. This shielding configuration has been worked into a beam line model using Geant4. We study particularly the advantages of single crystal sapphire and silicon blocks.

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