

Mechanical design of 10B based technology neutron detectors

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The design and construction of the European Spallation Source ERIC (ESS) is taking place in Lund, Sweden. Fifteen instrument proposals have been selected and all of these require a new generation of detectors in order to meet the unprecedented neutron instantaneous flux. Due to the shortage of ^3He gas and its counting rate capability limitations, the detectors of about half of these fifteen instruments will require to be based on a new technology. One of the best alternatives found for neutron detectors is ^{10}B . The technology for these is being developed within the Detector Group. The fact that the neutron conversion occurs in a solid layer and that layers must be carefully arranged to meet detection requirements, require novel engineering solutions. In this presentation, we will show the mechanical engineering effort currently underway to implement the ^{10}B technology neutron detectors, design and construction of prototypes this far, together with the progress and results on these detector demonstrators. The presentation will focus on the MultiBlade and MultiGrid technologies. The MultiBlade is a Boron-10-based detector conceived to face the challenge of counting rate capability in the neutron reflectometry. The MultiBlade technology will be installed at the ESS reflectometer instruments: ESTIA and FREIA. The MultiGrid, introduced at the ILL, and jointly developed between ILL and ESS, is aimed to enable the large detector area, while eliminating the limitations related to the ^3He , required by the upcoming instruments CSPEC and T-REX, the cold and the thermal spectrometers being built at ESS.

Formal Invitation Letter Required

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