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INVITED: Advances in Thermal Neutron Detection: Retrospective of the Past Decade and Current Trends in Future Developments in the Context of Construction of the European Spallation Source

Monday 27 June 2022 09:00 (30 minutes)

The European Spallation Source (ESS), currently under construction in Lund, Sweden has the goal to become the world's leading neutron source for the study of materials. Fifteen neutron instruments are currently being built as part of the construction project, which started in 2013 with the completion of the Technical Design Report (TDR).

These instruments present numerous challenges for detector technology in the absence of the free availability of Helium-3, which is the default choice for detectors for instruments built until today and due to the extreme rates and challenge in requirements expected across the ESS instrument suite, which are a significant factor more than at current sources. Additionally, this poses a challenge for the electronics due to a much higher channel count on the detectors.

This contribution presents the neutron detector baseline for the instruments currently under construction. The data acquisition strategy is outlined. A retrospective of the past decade of advances in neutron detector development is given. This effort has involved a wide collaboration of ESS in-house, in-kind arrangements with partner institutes and grant-based funding to realise.

Lastly some personal perspectives are given on current and likely trends for future neutron detector developments as well as promising avenues of exploration.

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Session Classification: Detector Systems