Contribution ID: **182** Type: **Invited Oral**

Neutronics activities for European DEMO fusion reactor shielding and breeding blanket designs

Thursday 12 June 2025 11:05 (40 minutes)

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Recent efforts in the EUROfusion programme towards the realization of a fusion power plant are aiming at developing the conceptual designs of a DEMOnstration fusion reactor and a Volumetric Neutron Source (VNS) facility. The critical role of neutronics and activation studies in support of the design and safety of DEMO requires a strategical approach starting from methodological and validation efforts through development of 3D models to various design and safety related activities. Optimization efforts on conceptual shielding, stipulated by VNS neutronics studies, are supporting the radiological protection framework for DEMO. A comprehensive effort addressing the DEMO breeding blanket designs for the Helium-Cooled Pebble Bed (HCPB), Water-Cooled Lithium Lead (WCLL) and Water-cooled Liquid lead Ceramic Breeder (WLCB) variants entails optimization studies for the respective tritium breeding ratio.
This work has been carried out within the framework of the EUROfusion Consortium, funded by the European Union via the Euratom Research and Training Programme (Grant Agreement No 101052200 —EUROfusion). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

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Session Classification: Neutronics