Einladung zum Seminar über „Nukleare Energieerzeugung“

Zeit: Montag, 31. Mai 2021, 11:00 Uhr

Ort: Das Seminar findet online statt.

Referent: Herr Dr. Moataz Salah Mohammed Khedr Harb, Karlsruher Institut für Technologie, Institut für Neutronenphysik und Reaktortechnik

Titel: Assessment of Neutronics and Shielding Performance for Revised Pipe Forest and Bioshield Plug of ITER TBM ports

Abstract:
ITER is an international cooperative effort aimed at demonstrating the physics of burning plasma, which is considered an important step along the road for the realisation of the commercial/civilian application of fusion for purposes of power generation. As a test facility, it is planned to have many ports/penetrations to perform testing of different physical/engineering concepts in the fusion environment, such as tritium breeding. ITER is foreseen to have four Test Blanket Systems (TBS), in two dedicated equatorial ports, sharing the corresponding TBM Port Plug (TBM-PP) and the Port Cell (PC) area. A TBM-PP consists of a TBM-Frame and two TBM-Sets (or two Dummy-TBMs). The TBM-PP and the associated systems must provide adequate shielding to protect radiation sensitive equipment (e.g. Vacuum Vessel (VV), cryostat, magnets, and various electronics), as well as the local environment for human access, like the PCs.

Significant evolution of the Pipe Forest (PF) concerns its overall layout, the Bioshield Plug (BP) and its central part (CBP), adding a decay tank for the Water Cooling System (WCS), and B4C based local shielding. The proposed layout of the PF and BP allows for a maintenance corridor up to the TBM-PP and PF interface using a “butterfly” doors concept at the BP as suggested by the project. Therefore, a scoping analysis to estimate the effect of the proposed changes on the shielding performance of the BP+CBP is necessary.

In this presentation, results from nuclear analyses performed to assess the radiation fields during operation and after shutdown will be discussed. The analyses assessed the contribution of the changes to the PF and BP on the shielding performance, with respect to the target neutron flux behind the BP, and the shutdown dose rate (SDDR) in all areas relevant for maintenance operations. In addition, the efficacy of adding shielding layers to the PF enclosure and to the BP was examined and results will be introduced.

gez. R. Stieglitz