# Neutronic characteristics of the ITER Diagnostic Equatorial Port

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Performed neutronics analysis of the ITER diagnostic Equatorial Port #8 (EP8) irradiated by 14 MeV neutrons from D-T plasma chamber allowed to describe in this paper neutronic characteristics of the ITER typical diagnostic equatorial port. These characteristics should provide personnel radiation protection and shielding of the diagnostic components during all the phases of ITER operation and shutdown. The protection is assumed against decay gamma radiation for possible personnel inspection and maintenance in the interspace and port cell areas. The protection capability is numerically assessed by means of the Shut-Down Dose Rate (SDDR) calculations in the EP8 interspace area. Neutronic characteristics also included neutron and prompt gamma flux distributions inside the port, neutron damage, nuclear heating in the port structural and mirror materials. The mirrors were arranged at the bending points of dogleg labyrinth in EP8 diagnostics optical pathways. The labyrinth configurations and selection of the shielding materials have been optimized during the EP8 designing process. Inside several voids of the EP8 plug, photon and electron emission energy distribution spectra emitted from the surrounded materials have been calculated. These spectra were used as input data for an estimation of hydrogen isotopes ionization inside the port channels. The MCNP6.20 code in the coupled neutron-photon-electron mode with the EPRDATA14 Electron-Photon-Relaxation Data has been used for calculation of photon and electron spectra in the energy interval of 10 eV - 20 MeV, with particular consideration of its low-energy (E<1 keV) part. The CAD-based neutronics procedures adopted by the ITER Organization (IO) have been applied in this work, using the state-of-the-art transport codes, libraries, and models.

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