

## PRELIMINARY NEUTRONIC ANALYSIS OF ITER HIGH RESOLUTION NEUTRON SPECTROMETER COLLIMATOR

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The High Resolution Neutron Spectrometer will be one of the biggest and most complex neutronic diagnostics in ITER. It will be located in Equatorial Port Plug 1, which is a very busy Port Plug. It will include several neutron detection techniques such as Magnetic Proton Recoil or Time-of-Flight. It is foreseen that it will be able to perform a wide range of measurements in both DD and DT operations.

Since detectors have to be placed in the port cell far away from plasma surface, an efficient collimation system has to be provided. The collimator has to allow an output neutron flux as intense as possible while regarding the objectives of nuclear safety and radioprotection. The collimator has also to control the quality of the spectral response arriving to the detectors, ensuring an acceptable Signal-to-Noise ratio.

MCNP is a Monte Carlo code widely used worldwide to model neutron, photon, and electron transport. This study presents a set of parametric analyses performed with MCNP5 using a simple geometry. With this simple geometry the effect of key parameters on the response of the collimator can be isolated. Parameters such as the aperture in First Wall, the aperture of the cone of vision or the used materials have a significant effect on neutron flux at collimator output and interspace volume.

Finally all those geometric and material parameters are condensed on a set of recommendations and a preliminary design of the collimator is proposed.