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ASSESSING SIGNALS OF BORON OPTICAL DIAGNOSTICS IN ITER NEAR-WALL PLASMA *)

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New ITER baseline concept with Tungsten first wall blankets instead of Beryllium, and the prospect of the first wall (FW) boronization procedures, raises the new task for "H-alpha and Visible Spectroscopy" diagnostic to measure the profile of Boron efflux from FW surface basing on the visible boron lines in the SOL. Since neither Boron erosion, nor updated divertor scenario modeling have been performed yet, at the first stage the currently available results of Be wall erosion modeling are applied [1, 2]. The modeling was performed by the spatial 3D Monte Carlo numerical code ERO2.0 for the CAD-relevant 3D profile of Be first wall, using the distributions of plasma parameters in the near-wall plasma and divertor derived by 2D code SOLPS and extended, where necessary, to FW surface. This will allow to calculate 3D emission profiles of the Boron atom and ion lines of interest (currently 563, 703 and 412 nm are considered) and to estimate the diagnostic signals (emission intensity at the indicated lines in the fields of view in the system) taking into account the reflection from the first wall of the radiation of boron atoms and ions in the near-wall plasma and divertor using the ray-tracing library Raysect [3] in the vacuum chamber with the assumed reflection characteristics of the first wall surface.

In the present work, the first results of the described above modeling are presented. They will be used as a basis for preliminary assessment of the Boron flux measurement and transfer to the next stage of simulations: tomographic reconstruction of 3D emission profile of Boron atoms and ions (radiation power density) within the framework of synthetic ITER diagnostics based on simulated signals on the imaging cameras, and finally the expected Boron flux from FW will be calculated using the SXB method [4, 5], similar to earlier analyses for the Beryllium first wall [6].

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