TOMOGRAPHIC RECONSTRUCTION OF THE THREE-DIMENSIONAL beryllium emissivity PROFILE IN THE ITER boundary PLASMA TAKING INTO ACCOUNT THE REFLECTIONs of light FROM THE FIRST WALL [[1]](#footnote-1)\*)

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A method of tomographic reconstruction of three-dimensional (3D) beryllium spectral lines emission profiles in visible range with subsequent assessment of beryllium influx density from the first wall (FW) into the plasma is proposed for ITER. The stray light produced by reflections from the metallic FW is taking into account using ray-tracing technique. The method consists of two steps: (i) reconstruction of 3D beryllium emission profile in ITER boundary plasma from the images obtained with wide-angle filtered cameras and line-of-sight arrays; (ii) assessment of distribution of beryllium influx density along all beryllium components of FW by integrating the product of reconstructed emission profile and the S/XB coefficient [1,2] along the normal to the FW surface. Similar to [3], the method utilizes the Raysect ray-tracing [4] and CHERAB spectroscopy modelling frameworks [5]. The accuracy of this method is evaluated on the synthetic data produced by ITER global beryllium migration modeling with the ERO2.0 code [6].

With the light reflection properties of the FW known with high enough accuracy and with known values of the electron density and temperature in the plasma boundary, the method allows to recover beryllium fluxes integrated along the blanket modules with an error of less than 30% for most blanket modules subject to significant erosion in a given regime. It is shown that neglecting light reflections in some regimes leads to a twofold overestimation of the total recovered beryllium influx in comparison with its true value.

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