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## **Short\_Oral\_32: Status of the ITER CXRS diagnostic system modeling**

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Charge Exchange Recombination Spectroscopy (CXRS) is a powerful diagnostic tool for fusion plasma in tokamaks [1, 2]. The ITER CXRS system will provide spatially resolved measurements of the ion temperature, low-Z impurity density and rotation velocity. These plasma parameters are extracted from the active charge-exchange (CX) spectral line, emitted during high-energy neutral beam injection into plasma. The measurements could become complicated because of the low signal-to-noise ratio (SNR) and the presence of the other spectral lines due to CX reactions with the edge neutrals (passive CX line) and due to the electron impact excitation (edge lines). Therefore, modeling is an important part of the diagnostic.

This report describes the status of the ITER CXRS diagnostic system modeling. Modeling was carried out for the latest system design using Simulation of Spectra code [3]. Statistical errors for ion temperature, density, and rotation velocity were calculated. Minimal concentrations, allowing measurements with the required accuracy, were obtained. Halo effect influence on the measurements was assessed. Alternative modeling using ray-tracing CHERAB [4] framework was also carried out. This allowed among other things to estimate the contribution of the reflected light from the metallic first wall. The comparison of two principally different models confirmed the reliability of the obtained results.

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization.

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