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P3.057 Geometrical effect in the measurement of the CXRS on EAST

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Charge eXchange Recombination Spectroscopic (CXRS) diagnostic system was successfully applied on EAST campaign. The CXRS located at D port was designed to focus on the tangential neutral injection beam from Port A on EAST. However, the tangential beam and the perpendicular beam are always injected into the plasma at the same time for the better heating and current driving. Therefore, spectrum collected by the CXRS contains information from both beam, which deteriorates the spatial resolution of the CXRS. To solve the problems, the simulation based on the simulation of spectra (SOS) was carried out. An upgrade on SOS has been performed to add the effect of the width of the injected beam. Based on the improved SOS, the simulation work has been done with input parameters (beam, geometry, and spectrometer parameters based on the actual EAST data; plasma properties were shaped as: ne, Te, Ti, Vt∝(1-(r/a)^2)^α). The results showed that if the active spectra were fitted by single Gaussian, the deviation brought by geometrical effect relies on the gradient of the plasma parameters, for example, up to 30% error at the edge and ~20% at the location of internal transport barriers (ITBs) on ion temperature and rotation measurement, in where the gradient of the parameters are large, while the error in the core without ITBs is less than 1%. Based on the simulation results, an iteration code was developed to correct the error, and make a good consistency with the input ion temperature and rotation profiles.

Co-author: YIN, Xianghui (university of south china)

Presenter: MAO, Shifeng (School of Physical Sciences University of Science and Technology of China)

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