# 2-D ECE imaging diagnostic for comparative study of MHD instabilities in WEST tokamak

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An electron cyclotron emission imaging (ECEI) diagnostic for WEST (W Environment for Steady state Tokamak) is on the last stage of the development under Korean-French collaboration, and the system will be installed before the 2018 autumn experimental campaign. The WEST ECEI diagnostic will initially provide 2-D $\Delta T_e$ images from the core to the low-field side (LFS) edge of the plasma (R= 2.4 ~ 3m) [1], and the detectable radial range will be extended to high-field side (HFS) edge in future. The WEST ECEI system is specially designed to overcome the limited accessibility and indirect beam direction: Two metallic mirrors, which can endure 400°C during long discharges, will be installed inside the vacuum vessel for beam focusing and redirection in the vicinity of the plasma. The detection element and focus control optics are vertically aligned in an optical enclosure of 2.7 m height installed in a narrow area behind the man-access port. The laboratory characterization with the integrated imaging optics had confirmed that the system can provide well-focused images from any radial location on the LFS of the plasma, with high spatial ($\leq$1.7 cm) resolution.

A synthetic image reconstruction tool for XTOR code is on development for numerical validation of the WEST ECEI measurement. The tool will provide synthetic images from XTOR result, taking into account the spatial resolution, instrumental effect and broadening effect of the ECEI system. The direct comparability of the 2-D images obtained from WEST ECEI and the synthetic images from XTOR, along with the core reflectometry measurements [2], synthetic images from JOREK and/or the ECE images from KSTAR and other tokamaks will provide deep understanding of the phenomena affected by tungsten impurities.

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**References**

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[2] R. Sabot et al, Comptes rendus de physique, **17**, 1018-1026 (2016)