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Validation of BOUT++ ELM simulation by Comparison with ECEI Measurements in the KSTAR tokamak MINWOO KIM, JAEHYUN LEE, MINJUN CHOI, GUNSU YUN, POSTECH, X.Q. XU, LLNL, WOOCHANG LEE, HYEON PARK, POSTECH, C.W. DOMIER, N.C. LUHMANN, JR., UC Davis, KSTAR TEAM — Details of ELM dynamics has been measured in 2D using an electron cyclotron emission imaging (ECEI) diagnostic in the KSTAR tokamak. The observed ELM dynamics show complex evolution stages including linear growth, saturation, changes in mode number and rotation velocity, and localized crash [1]. We studied the mode structure of the observed ELMs in the linear growth phase using 3-field BOUT++ simulations [2]. The toroidal mode number (n) of ELMs, which was experimentally determined by an array of toroidal Mirnov coils, was fixed in the simulation. On the other hand, the pressure profile was adjusted to make the linear growth rate finite at the given n number. For direct comparison with the observed images, the simulation results were converted to synthetic ECEI images by taking into account instrumental broadening, intrinsic ECE broadening in the pedestal region, and system noises. The synthetic images were qualitatively well matched with the observations. As a next step, a simulation study in linear phase is planned for a self-consistent equilibrium including bootstrap current. *Work supported by NRF Korea under contract no. 2013035905 and US DoE under contract no. DE-FG-02-99ER54531.

[1] G. S. Yun, et al., PRL 107 (2011)
[2] X. Q. Xu, et al., NF 51 (2011)

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