Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

ELM study in KSTAR H-mode plasma using ECEI observations and edge simulation[1] M. KIM, J. LEE, UNIST, H.K. PARK, UNIST, NFRI, G.S. YUN, POSTECH, J.M. KWON, NFRI, J.E. LEE, POSTECH, X.Q. XU, LLNL, S. KU, PPPL, KSTAR TEAM — Full understanding of ELM physics is one of the most important issues to achieve stable plasma operation in high-performance. In KSTAR H-mode plasmas, ELM physics have been studied by a comparative study between measured ELM images by electron cyclotron emission imaging (ECEI) and edge simulations. In comparative study, the mode structure from the simulation is converted to a synthetic image. An agreement between two images provided high confidence on the study of ELM structure using ECEI images. Because an ELM cycle is already nonlinear phase through saturated linear phase when it is able to be observed, a nonlinear simulation is required for an advanced comparative study. By comparing the observed images and that from the BOUT++ nonlinear ELM simulation, the role of transport (e.g. heat and particle diffusion) and dissipation (e.g. resistivity, hyper-resistivity and viscosity) coefficient is under investigation. The discrepancies between the observed coherent mode structures on the inboard side during inter-ELM-crash periods with the BOUT++ simulation results are investigated. An XGC simulation, full-f gyrokinetic PIC code, is introduced to explain the discrepancies in HFS mode structure. The growth of HFS mode will be discussed in this comparative study.

[1]This work is supported by NRF of Korea under contract no. NRF-2014M1A7A1A03029865.

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Date submitted: 14 Jul 2016 Electronic form version 1.4