Abstract Submitted
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Comparison of MHD simulation codes for understanding nonlinear ELMs dynamics in KSTAR H-mode plasma[1] M. KIM, J. LEE, UNIST, H. K. PARK, UNIST, NFRI, G. S. YUN, POSTECH, X. XU, LLNL, S. C. JARDIN, PPPL, M. BECOULET, CEA — KSTAR electron cyclotron emission imaging (ECEI) systems have contributed to understanding the fundamental physics of ELMs by high-quality 2D and quasi-3D images of ELMs. However, in the highly nonlinear phase of ELM dynamics, the interpretation of ECE signals becomes complicated intrinsically. Theoretical and numerical approaches are necessary to enhance the understanding of ELM physics. Well-established MHD codes (BOUT++, JOREK, and M3D-C1) are introduced for comparative study with the observations. The nonlinear solutions are obtained using the same equilibrium of the KSTAR H-mode plasma. Each code shows the partial difference in mode evolution, probably, due to the difference in optimized operation window of initial conditions. The nonlinear simulation results show that low-n ($n < 5$) modes becomes dominant close to pedestal collapse. The mode evolution in the simulations qualitatively matches with the recent ECEI observation just before ELM-crash, or excitation of non-modal solitary perturbation (typically, $n = 1$) [1] which is highly localized in poloidal and toroidal. Regardless of differences in details, qualitative similarity can provide inspiration to understand the triggering of ELM-crash. [1] J. E. Lee, et al., Scientific Reports, 7 (2017) 45075

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Minwoo Kim
Ulsan Natl Inst of Sci
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