

Abstract Submitted
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Ideal MHD Stability and Characteristics of Edge Localized Modes on CFETR¹ ZEYU LI, Peking University, VINCENT CHAN, University of Science and Technology of China, XUEQIAO XU, Lawrence Livermore National Laboratory, XIAOGANG WANG, Harbin Institute of Technology, CFETR PHYSICS TEAM — Investigation on the equilibrium operation regime, its ideal magnetohydrodynamics (MHD) stability and edge localized modes (ELM) characteristics is performed for China Fusion Engineering Test Reactor (CFETR). The CFETR operation regime study starts with a baseline scenario derived from multi-code integrated modeling, with key parameters varied to build a systematic database. These parameters, under profile and pedestal constraints, provide the foundation for engineering design. The linear stabilities of low-n and intermediate-n peeling-ballooning modes for CFETR baseline scenario are analyzed. Multi-code benchmarking, including GATO, ELITE, BOUT++ and NIMROD, demonstrated good agreement in predicting instabilities. Nonlinear behavior of ELMs for the baseline scenario is simulated using BOUT++. Instabilities are found both at the pedestal top and inside the pedestal region, which lead to a mix of grassy and type I ELMs. Pedestal structures extending inward beyond the pedestal top are also varied to study the influence on ELM characteristic. Preliminary results on the dependence of the Type-I ELM divertor heat load scaling on machine size and pedestal pressure will also be presented.

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