Abstract Submitted
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Rotational stabilization of RWM in CFETR 1GW steady-state operating scenario[1] RUI HAN, University of Science and Technology of China, PING ZHU, Huazhong University of Science and Technology, University of Wisconsin-Madison, LINJIN ZHENG, University of Texas at Austin, THE CFETR PHYSICS TEAM TEAM — The influence of toroidal plasma rotation on the stability of the resistive wall mode (RWM) is investigated using the AEGIS code for the newly designed China Fusion Engineering Test Reactor (CFETR) 1GW steady-state operating (SSO) scenario. Generally the RWM is found unstable in this scenario, and can be stabilized by uniform toroidal rotation above 1.5% core Alfvénic speed. However, the stabilizing effects are not so robust while considering the non-uniform rotation profiles. It is found that the rotation at the plasma edge region affects the RWM the most and the rotation in the core region is less crucial. This is due to the peeling-like mode structure caused by the high current and pressure gradients in the edge pedestal region. By artificially reduce the bootstrap current fraction and pressure gradient in pedestal region in the equilibrium, the amplitude of the internal mode radial eigenfunction becomes much larger relatively and have more interaction with the core rotation. Our study suggests that to keep RWM stable in CFETR 1GW SSO scenario, the edge rotation needs to be maintained at above 1.5% core Alfvénic speed, if none of the kinetic stabilization mechanisms for RWM is taken into account.

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