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Stabilization of RWM – Comparison between RFP and Tokamak SHICHONG GUO, ZHIRUI WANG, Consorzio RFX, YUEQIANG LIU, Euratom/CCFE Fusion Association, Culham Science Centre — In the present work, we make a comparison of the instability behavior of Resistive Wall Modes (RWM) between Reverse Filed Pinch (RFP) and Tokamak configurations, where both MHD and kinetic theories are applied on this study. Since the investigation is carried out in cylindrical and toroidal geometries, CMR-F code [1] and Mars-K code [2] are adopted for the numerical computation. The analysis of potential energy components has been performed in order to obtain a physical understanding of the two different systems. It is shown that due to the different magnetic configuration, the roles of the toroidal coupling effects lead to different mode spectrum and structures. Furthermore, the stabilization by plasma rotation requires rather different conditions of the flow velocity, which can be predicted just by the dissipative MHD theory. The kinetic effects (particle-wave resonance) on the mode stabilization in the two configurations are also investigated and compared. The influence of the kinetic stabilization on the current driven and pressure driven RWMs will be presented. In addition, the plasma responses to the feedback stabilization in the two devices will be also discussed.

[1] Z.R. Wang, S.C. Guo, Nucl. Fusion 51, 053004(2011).
[2] Y.Q. Liu, et al., Phys. Plasmas 15, 112503(2008).

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