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Kinetic Stabilization of the Resistive Wall Mode in Reversed Field Pinch plasmas ZHIRUI WANG, SHICHONG GUO, Consorzio RFX, YUEQIANG LIU, Euratom/CCFE Fusion Association, Culham Science Centre — It is known that, in tokamak, the kinetic effect may change the Resistive Wall Mode (RWM) stability condition and even stabilize the mode in the presence of little or no plasma rotation. In RFPs, previous studies based on MagnetoHydroDynamics pointed out that the stabilization of RWM requires the plasma rotation being in the range of Alfvén frequency (around 20% of Alfven velocity). In this work, we present the new results obtained by hybrid code Mars-K, associated with the latest developed potential energy analysis module. It is found that the full stabilization of RWM due to the parallel ion Landau damping (resonance between thermal passing particle and RWM) is revealed in high beta region, where the critical velocity required for the stabilization is predicted to be decreased to the ion acoustic velocity range (e.g. for n= -6 mode, around 3% of Alfvén velocity is required). Finally, the impact of kinetic effect on the fluid part of plasma potential energy has been be clarified, which can help to further understand the difference between perturbative approach and self-consistent approach in RWM study.

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