

Abstract Submitted
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Tearing mode dynamics and sawtooth oscillation in Hall-MHD¹

ZHIWEI MA, WEI ZHANG, SHENG WANG, Zhejiang Univ — Tearing mode instability is one of the most important dynamic processes in space and laboratory plasmas. Hall effects, resulted from the decoupling of electron and ion motions, could cause the fast development and perturbation structure rotation of the tearing mode and become non-negligible. We independently developed high accuracy non-linear MHD code (CLT) to study Hall effects on the dynamic evolution of tearing modes with Tokamak geometries. It is found that the rotation frequency of the mode in the electron diamagnetic direction is in a good agreement with analytical prediction. The linear growth rate increases with increase of the ion inertial length, which is contradictory to analytical solution in the slab geometry. We further find that the self-consistently generated rotation largely alters the dynamic behavior of the double tearing mode and the sawtooth oscillation.

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