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Numerical studies for the linear growth of resistive wall modes generated by plasma flows in a slab model XIAOGANG WANG, SHAOYAN CUI, YUE LIU, Dalian University of Technology, Dalian, China 116024 — The resistive wall mode generated by plasma-wall relative rotations is studied numerically in a slab model with a compressible plasma flow parallel to the magnetic field. The linear growth of the mode is investigated with different parameters in numerical simulations. The critical plasma flow velocities for the instability are calculated as the wavenumber of the mode and other parameters vary. It is found that in the long wavelength regime, the critical velocity is in the range of the sound speed c_s, as predicted in theory. In the short wavelength regime however, the critical velocity increases to a level of tens of times of Alfvén velocity V_A. Also a second stable region is found in the short wavelength regime which eventually merges with the first stable region as the wavenumber increases and stabilizes the mode. The growth rate of the mode is found decreasing with the wavenumber of the mode and the plasma viscosity. The critical wavenumber for the instability is also calculated as the plasma velocity changes. In addition, the linear growth rate versus the plasma β is also presented.

Xiaogang Wang
Dalian University of Technology, Dalian, China 116024

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