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Influence of equilibrium flow on the resistive tearing mode

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The resistive tearing mode instability is a well-known phenomenon that is often linked to magnetic reconnection. When magnetic field lines reconnect, this leads to a conversion of magnetic energy into kinetic or thermal energy. In turn, this can result in interesting events such as solar flares in the solar corona or the disruption of plasma confinement in tokamaks. Therefore, understanding how this tearing instability is influenced by various physical effects can lead to new insights on how such events are triggered. Since the literature regularly claims that flow has a stabilizing effect on the resistive tearing mode, we use the new linear 1D magnetohydrodynamic (MHD) spectral code Legolas (<https://legolas.science>) to combine the effects of equilibrium flow and resistivity to examine the influence of the flow on the tearing mode parametrically. This allows us to investigate the influence of the flow speed, the wavelength, the angle between flow and wavevector, etc. in different magnetic field configurations. This parametric study serves as a first step in identifying the combined effects of equilibrium flow, magnetic shear and finite resistivity on the linear MHD spectrum.

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