Damping of Kinetic Alfvén Eigenmodes in Tokamak Plasmas

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The ability to predict the stability of fast-particle-driven Alfvén eigenmodes in burning fusion plasmas requires a detailed understanding of the dissipative mechanisms that damp these modes. In order to address this question, the linear gyro-kinetic, electromagnetic code LIGKA [1] is employed to investigate their behaviour in realistic tokamak geometry. LIGKA is based on an eigenvalue formulation and self-consistently calculates the coupling of large-scale MHD modes to gyro-radius scale length kinetic Alfvén waves. It uses the drift-kinetic HAGIS code [2] to accurately describe the unperturbed particle orbits in general geometry. In addition, a newly developed antenna-like version of LIGKA allows for a frequency scan, analogous to an external antenna.

With these tools the properties of the kinetically modified TAE in or near the gap (KTAE, radiative damping or 'tunneling' [3]) and its coupling to the continuum close to the edge are numerically analysed.

The results are compared with previous calculations based on fluid [4-7] and other gyrokinetic models [8].

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