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Modelling the effect of toroidal plasma rotation on drift-magnetohydrodynamic modes in tokamaks IAN CHAPMAN, TIM HENDER, SERGEI SHARAPOV, UKAEA Fusion Association, GUIDO HUYSMANS, Association EURATOM-CEA Cadarache, ANATOLII MIKHAILOVSKII, RRC Kurchatov Institute — A new code, MISHKA-F has been developed in order to investigate linear MHD stability of ideal and resistive eigenmodes with respect to the effects of toroidal rotation in tokamaks in general toroidal geometry with the ion diamagnetic drift effect taken into account. Benchmark tests show good accordance with analytic theory for the stability limits of the n/m=1/1 internal kink mode with respect to toroidal rotation. Also, the stabilizing effect of the ion diamagnetic drift frequency on the internal kink mode is found to be more effective at finite flow shear. The stabilization of ballooning modes by toroidal rotation agrees well with analytic predictions if the local magnetic shear is below a critical value, above which no stabilization is exhibited. The effect of high flow shear is also analyzed for sawtoothing discharges in MAST, where it is found that stabilization of the n=1 internal kink mode by toroidal rotation may account for the observed sawtooth period increase.
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