Shear Flow Destabilization of a Slowly Rotating Tokamak

M.S. Chu
General Atomics
San Diego, California 92186-9784, U.S.A.

Abstract

The Kelvin-Helmholtz destabilizing effect of shear in toroidal rotation on ideal magnetohydrodynamic localized interchange is studied in a tokamak with a general geometry. We utilize the method of maximizing the expression of the growth rate given by Frieman and Rotenberg. An explicit stability criterion is given for a slowly rotating tokamak with a non-negligible shearing rate in its rotation profile. It is found that rotation shear can weaken the stabilizing effect of the magnetic field shear and also allow the coupling of the sound wave to the shear Alfvén wave which destabilizes the plasma.