Magnetic island deformation due to sheared flow and viscosity

C. Ren,[a] M.S. Chu,[b] and J.D. Callen[a]

[a] *University of Wisconsin-Madison, Madison, WI 53706-1687*

[b] *General Atomics, P.O. Box 85608, San Diego, CA 92186-9784*

Abstract

A partial differential equation for a two-dimensional magnetohydrodynamic (MHD) equilibrium with flow and viscosity is derived. The equation is used to describe the deformation of the magnetic island caused by the viscous drag of a sheared flow. The deformation is characterized by the phase gradient of the magnetic perturbation across a magnetic island. This phase gradient has been observed experimentally in electron cyclotron emission data from the DIII-D tokamak [J.L. Luxon and L.G. Davis, Fusion Technol. **8**, 441 (1985)].