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The effect of sheared toroidal flow on nonlinear pressure driven magnetic islands in tokamaks[1] C. C. HEGNA, University of Wisconsin-Madison — Empirically it is known that sheared toroidal rotation tends to have a stabilizing effect on neoclassical tearing modes. In this work, an analytic theory of nonlinear pressure driven magnetic island evolution is presented that accounts for sheared toroidal rotation at the rational surface. The derivation relies upon an asymptotic analysis of MHD equilibrium equations with plasma flow in the vicinity of a magnetic island assuming a small island approximation. Particular attention is paid to helical Pfirsch-Schluter current contributions to island evolution and the asymptotic matching indices. Both of these quantities are modified by sheared flow with the sheared flow enhancing the stabilizing resistive interchange contribution to the modified Rutherford theory in a tokamak.

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