On the rotation of magnetic islands in a tokamak

X. GAR-BET, CEA Cadarache, France, A. SMOLYAKOV, University of Saskatchewan, Canada, E. LAZZARO, Istituto di Fisica del Plasma, Italy, M. OTTAVIANI, CEA Cadarache, France — We investigate various mechanisms affecting the rotation of magnetic islands. Generally, the rotation of a magnetic island is determined by a \( \sin \left[ m(\theta - \zeta/q) - \omega t \right] \) component of the non-ambipolar electric current. We consider several processes leading to the transverse non-ambipolar electric currents in a tokamak such as small-scale electromagnetic turbulence, anomalous viscosity, and neoclassical transport. It is argued that in a toroidal plasma the non-ambipolar neoclassical transport is a dominant process. It results in the locking of the magnetic island into the ion poloidal motion.

A Smolyakov
University of Saskatchewan

Date submitted: 22 Jul 2005 
Electronic form version 1.4