Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Plasma Angular Momentum Loss Processes: Recoil Involving Mode-particle Resonances with Traveling Modes and Recoil Associated Particle-Ejection by Collisional Ballooning Modes* O. OHIA, B. COPPI, MIT — The most immediate interpretation [1] of the spontaneous rotation phenomenon in axisymmetric toroidal plasmas involves processes providing ejection of angular momentum from the edge of the plasma column and the consequent recoil of this. One process considered to prevail in the H-regime, where steep pressure gradients can form at the edge, involves a collisional ballooning mode with a toroidal phase velocity in the direction of the electron diamagnetic velocity. The mode has a considerable angular momentum and particles are expelled by it with a toroidal velocity component in the same direction as the mode phase velocity. The other process, assumed prevalent in the L-regime, depends on the presence of a cold particle population at the edge, in addition to the "hot" particle population, and on the excitation of an "impurity-like" mode with phase velocity in the ion diamagnetic velocity direction. The mode is of the traveling type along the magnetic field, unlike ballooning modes, with relatively short wavelengths (collisionless). The mode serves as a catalyst providing toroidal acceleration and ejection of the hot particle population, and toroidal deceleration and inward transport of the cold population.
*U.S. D.O.E. partially sponsored.
[1] B. Coppi, *Nucl. Fus.* **42**, 1 (2002).

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Date submitted: 17 Jul 2008 Electronic form version 1.4