

Abstract Submitted
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Theoretical Issues on the Spontaneous Rotation of Axisymmetric Plasmas* T. ZHOU, B. COPPI, MIT — An extensive series of experiments have confirmed that the observed phenomenon of “spontaneous rotation” in axisymmetric plasmas is related to the confinement properties of the concerned plasmas and connected to the excitation of relevant collective modes [1]. Localized modes can extract angular momentum from the plasma column from which they grow while, the background plasma has to recoil in the direction opposite to that of mode phase velocity. In the case of the excitation of plasma edge modes, the loss of their angular momentum can be connected to the directed particle ejection to the surrounding medium. The recoil angular momentum is then redistributed inside the plasma column mainly by such processes as an effective viscous diffusion and inward flow (pinch) that is connected, for instance, to ITG driven modes. The linear and quasilinear theories of the collisionless trapped electron modes and of the toroidal ion temperature gradient driven modes are re-examined in the considered context. Relevant features of the weakly collisional drift tearing mode and of the $m^0 = 1$ internal mode, are pointed out. *Sponsored in part by the US DOE.

[1] B. Coppi, 18th IAEA Fusion Energy Conf. THP 1/17 (2000). and *Nucl. Fus.* **42**, 1 (2002).

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