

Abstract Submitted
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**Spontaneous Rotation as a Recoil Process—Novel Experimental
Evidences and Consistency with the Tenets of the Accretion Theory¹** B.

BASU, B. COPPI, T. ZHOU, MIT — The Accretion Theory [1] of the spontaneous (a.k.a. intrinsic) rotation phenomenon observed on axisymmetric toroidal plasmas was based on the idea that angular momentum is ejected by collective modes from the plasma column and therefore the plasma rotates in the opposite direction. Until recently, the entire plasma column was observed to rotate unidirectionally and the ejection was directed to the plasma chamber, which can not be seen to counter-rotate. According to recent experiments [2], pairs of adjacent regions rotating in opposite directions can emerge within a given plasma column. Thus we argue that, if the prevalent modes are excited in the narrow region within the plasma column where the radial gradients of relevant plasma parameters are significant, angular momentum can be expelled toward the outer region. Then the inner region rotates as a recoil from this expulsion, in the direction opposite to that of the rotation of the outer region. The linear and quasi-linear theories of the modes involved in the relevant transport processes are given.

[1] B. Coppi, Nucl. Fusion 42,1 (1966).

[2] J. Rice et al., Nucl. Fusion 51, 083005 (2011).

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