

Abstract Submitted
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Kink-tearing mode conversions with current interchange and small parallel ion velocity effects taken into account¹ LINJIN ZHENG, University of Texas at Austin, Institute for Fusion Studies — The conversions of kink type of modes, such as $n = 1$ internal kink mode, RWMs, etc., to tearing modes are widely observed experimentally. In this presentation we explain these conversions using the theory of newly discovered current interchange tearing modes [CITMs, Zheng and Furukawa, *Phys. Plasmas* **17**, 052508 (2010)], with the kinetic enhancement of parallel inertia by the so-called small parallel ion velocity effect [SPIV, Zheng and Tessarotto, *Phys. Plasmas* **3**, 1209 (1996)] taken into account. Interchange-type (i.e., kink) modes exchange not only thermal and magnetic energies, but also current, between flux tubes, so that current sheet can be formed at mode rational surfaces and kink type of modes are converted to tearing type of modes. It is pointed out that, when the so-called SPIV inertia enhancement is taken into account, the current interchange effect becomes the dominant driving force for field line reconnection. The underlying physics will be explained intuitively. Both analytical and numerical results will be presented. Extension of AEGIS code to study the kink-tearing mode conversion processes will also be discussed.

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