

Abstract Submitted
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Evolving Magnetic Reconnection in Well Confined Plasmas with Low Collisionalities* B. COPPI, MIT — There are two kinds of modes, producing large scale magnetic islands in well confined plasmas with low degrees of collisionality. These have phase velocities of opposite signs and are expected to emerge following the excitation of other modes as they cannot be found to be linearly unstable. One type is the “drift-tearing” [1] mode with a phase velocity in the direction of the electron diamagnetic velocity (v_{de}) and the other is classified as an “inductive” mode [2] with a phase velocity in the direction of v_{di} . The “drift-tearing” can be excited after a mode that has the effect of decreasing the ratio of the longitudinal to the transverse electron thermal conductivity, like the “micro-reconnecting” mode discussed in Ref. [3]. The second type requires the previous excitation of a pressure gradient driven mode [4] that has a flow velocity in the v_{di} direction. Moreover, a mode-particle resonance with a high energy particle population [1] is involved in the growth of both the primary and the secondary (reconnecting) mode. Recent experimental observations [4] are consistent with these conclusions. Sawtooth oscillations that involve periodic reconnection events and modes that are related to those described earlier are discussed. *Sponsored in part by the U.S. DoE. [1] B. Coppi, *Phys. Fluids* **8**, 2273 (1965) [2] B. Coppi, *Bull. Am. Phys. Soc* **45**, 366 (2000) [3] B. Coppi, in “Collective Phenomena etc.” pg. 59, Eds. G. Bertin *et. al.*, *Publ. World Scientific* (2007) [4] P. Buratti *et al.* Paper 02.007, 2009 E.P.S. Conference

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