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"Complex Reconnecting" Modes and Critical Direction of their Propagation* P. BURATTI, ENEA, B. COPPI, MIT, G. PUCELLA, ENEA — Experiments in weakly collisional plasma regimes (e.g. neutral beam heated plasmas in the H-regime [1]), measuring the Doppler shift associated with the plasma local rotation [1], have shown that the direction of the propagation of the observed reconnected structures in the frame with $E_r = 0$ is in the direction of the ion diamagnetic velocity. This is contrary to the direction of the phase velocity of the "drift-tearing" modes found originally in the Ref. [2]. Consequently, the theory of "Complex Reconnecting" Modes has been developed that include the effects finite ion gyro radius, finite ion transverse viscosity, finite longitudinal electron pressure and magnetic diffusion coefficient. Thus modes are found with very low values of the growth rate, a phase velocity about equal the ion diamagnetic velocity that is consistent with recent experimental observations, and widths of the reconnection layer larger than the ion gyro radius. Another option involves assuming the presence of a plasma inductivity [3] in the electron momentum conservation equation. *Sponsored in part by the US Department of Energy.

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[2] B. Coppi, Phys. Fluids **8**, 2273 (1965).
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