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Magnetic Reconnection and Associated Transport of Plasma Thermal Energy[1] V. ROYTERSHTEYN, B. COPPI, MIT, C. YARIM, I.T.U. Instabul, Turkey — The high-temperature theory of the collisional drift-tearing mode [1] that associates a process of magnetic reconnection with the thermal energy transport is presented. In the regimes relevant to present day experiments the longitudinal electron thermal conductivity plays a key role. The novel analysis that has been developed [2] shows that while the onset of the mode alters the magnetic field topology on a macroscopic scale, the associated fluid velocities are basically localized in the region where magnetic reconnection takes place and the effects of finite electron conductivity are important. The characteristics of the mode and of the reconnection region are shown to differ significantly from the ones described in the original work [1] where regimes with relatively high collisionality were considered. The limitations on the linear mode amplitude necessary for the validity of the linearized approximation are identified and a highly simplified non-linear model equation to describe the mode evolution is considered.
[1] B. Coppi, *Phys. Fluids*, **8**, 2273 (1965).
[2] B. Coppi, V. Roytershteyn and C. Yarim, Paper IAEA-CN-116/TH/P2-29, I.A.E.A. Fusion Conference 2004

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