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Resolution of the Mesoscopic Reconnection Theoretical Dilemma* B. COPPI, C. CRABTREE, V. ROYTERSHTEYN, M.I.T. — The drift-tearing mode[1] involves magnetic reconnection and the gradients of electron temperature and density as well as that of the current density. Experiments with lower degrees of collisionality than those for which the mode was identified have shown that magnetic reconnection leading to relatively large islands persists, while according to subsequent theories[2] the effects of electron temperature gradients and Landau damping or longitudinal thermal conductivity[2] prevent, in practice, the excitation of this mode. To resolve this paradox, we consider[3] that mesoscopic reconnecting modes develop from a coherent background of micro-reconnecting modes with short scale distances ($< c/\omega_{pe}$) generating a series of strings of small magnetic islands that are driven by the electron temperature gradient. Thus a reduction of the electron thermal conductivity along the field lines and an increase of the transverse thermal conductivity can take place. The combination of both effects is shown to restore the excitation of mesoscopic modes involving the effects of finite resistivity, electron thermal conductivities, and temperature and current grandients. *Sponsored by the U.S. D.O.E.

[1]B. Coppi, *Phys. Fluids* **8**, 2273 (1965)
[2]B. Coppi, et al., *Phys. Rev. Lett.* **42**, 1058 (1978)
[3]B. Coppi, et al., 21 IAEA FEC(Chengdu, China), TH/R2-19, 2006

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