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Intrinsically Electromagnetic (Micro-Reconnecting) Modes and Electron Thermal Energy Transport[1] CHRIS CRABTREE, BRUNO COPPI, MIT — The main features of the micro-reconnecting mode [1], whose relevant asymptotic limit requires a kinetic description, are i) it has a natural transverse (to the magnetic field) scale distance of the order of $d_e = c/\omega_{pe}$, ii) it produces strings of microscopic magnetic islands, iii) it does not require electron gyroradius effects, iv) it is driven by the transverse electron temperature gradient. The mode is charaterized by $\omega \sim k_\parallel v_{te}$, ω being the mode complex frequency that is of the order of $k_\perp cT_e/(eBr_{Te})$, and $1/r_{Te} \equiv -(\mathrm{d}\log T_e/\mathrm{d}r)$. The implied ordering, $\beta_e \sim 2r_{Te}^2/L_s^2$ where β_e, the ratio of electron thermal energy density to the magnetic energy density, is regarded as relevant to current experiments such as those carried out by the NSTX device where modes with transverse scale distances of the order of d_e have been identified [2]. The considered mode does not produce an appreciable particle transport while the relevant effective thermal diffusion coefficient $D_{e\perp}^{th}$ is estimated to be of the order of $(d_e/r_{Te})cT_e/(eB)$. This mode, and the trapped electron mode, are the primary candidates to explain the observed anomalous electron thermal energy transport in modern high temperature toroidal plasmas. [1] B. Coppi, in *Collective Phenomena in Macroscopic Systems*, p. 59, *publ.* World Scientific (2007). [2] E. Mazzucato, R. E. Bell, J. C. Hosea, *et al.*, *Am. Phys. Soc.*, **52**, 61 (2007).

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