Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

High Energy Particle Populations Associated with Magnetic Reconnection[1] B. COPPI, B. BASU, MIT — Magnetic reconnection events associated with a variety of laboratory and astrophysical plasmas have been observed to be related to the production of high energy particles. In this context the theory of weakly collisional or collisionless reconnecting modes has been found to generate relatively large "temperatures fluctuations" (e.g. of the electron population) associated with significant reconnection fields. The spatial singularity of the temperature fluctuations can, in fact, be removed by the finiteness of the transverse relevant thermal conductivity. An important requirement for this is that the temperature gradient of the involved particle species be significant within the layer where reconnection takes place. With reconnection depending on a finite inductivity [1] associated with the local current density the characteristic layer over which these modes are localized remains significant (strong reconnection) even when the involved macroscopic distances (e.g. in astrophysics) are very large. This is in contrast with the features of the well known tearing mode that is a case of weak reconnection.

[1] B. Coppi, *Bull. Am. Phys. Soc.* **45**, (2000) 366.

[1]Sponsored in part by the U.S. DoE.

Bruno Coppi
MIT

Date submitted: 14 Jul 2015 Electronic form version 1.4