Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Magneto-thermal Reconnection: Concept of Substance and Definitive Proof B. COPPI, B. BASU, Massachusetts Institute of Technology MIT — A purely oscillatory mode is identified that involves magnetic reconnection in the presence of a significant electron temperature gradient, of a finite transverse electron thermal conductivity ($\propto D^e_\perp$) and of a relatively large longitudinal thermal conductivity ($\propto D^e_\parallel$). The presence of a finite electrical resistivity, electron inertia, or of an inductivity, that is of a conventional Ohm's law, is not required although the mode is influenced by the relevant effects. The simplest unperturbed confinement configuration in which these modes can be sustained is a plane geometry with a sheared magnetic field. The mode frequency depends on the electron temperature gradient and the phase velocity is in the direction of the electron diamagnetic velocity. Since the width of the layer where reconnection takes place is proportional to $\left(D^e_\perp/D^e_\parallel\right)^{1/4} L_\perp$, where $L_\perp$ is a macroscopic length, and there is ample experimental evidence of the fact that $D^e_\perp$ can be considerable the issue of dealing with reconnection layers that can be unrealistically small can be avoided. [1] B. Coppi and B. Basu, Phys. Plasmas **26**, 042115 (2019).

Bamandas Basu
Massachusetts Institute of Technology MIT

Date submitted: 05 Nov 2020 Electronic form version 1.4