

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Does a contact discontinuity exist within the Hall-MHD model?¹

ELIEZER HAMEIRI, New York University, Courant Institute of Mathematical Sciences — The stability analysis of a z-pinch equilibrium state with a surface discontinuity, carried out within the Hall-MHD model (1), indicates that one jump condition across the discontinuity is missing. Indeed, Ref. (1) resorts to an extraneous condition based on mathematical convenience which seems not justifiable physically, with the result of the analysis being very different from equilibrium with continuous profiles albeit with sharp gradients. We attempt to generate the missing jump condition using a variational analysis for the equilibrium state. Surprisingly, the allowed equilibria appears so restricted, that they are practically irrelevant for fusion-related configurations. For example, the total plasma current must vanish. We give further indications for the correctness of this conclusion. (1) U. Schaper, J. Plasma Phys. 30, 169 (1983).

¹This work is supported by U.S. Dept. of Energy Grant No. DE-FG02-86ER53223.

Eliezer Hameiri
New York University, Courant Institute of Mathematical Sciences

Date submitted: 17 Jul 2009

Electronic form version 1.4