

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Noether Currents for Eulerian Variational Principles in Non Barotropic Magnetohydrodynamics and Topological Conservations Laws¹

ASHER YAHALOM², Ariel University, HONG QIN, Princeton University, Princeton, New Jersey 08543, USA — We derive a Noether current for the Eulerian variational principle of ideal non-barotropic magnetohydrodynamics (MHD). It was shown previously that ideal non-barotropic MHD is mathematically equivalent to a five function field theory with an induced geometrical structure in the case that field lines cover surfaces and this theory can be described using a variational principle. Here we use various symmetries of the flow to derive novel topological constants of motion through the newly derived Noether current and discuss their implication for non-barotropic MHD and plasma confinement.

¹This research was supported by the U.S. Department of Energy (DE-AC02-09CH11466).

²Also with Princeton University, Princeton, New Jersey 08543, USA

Asher Yahalom
Ariel University

Date submitted: 28 Jun 2020

Electronic form version 1.4