

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Second Energy Variation for Heterogeneous Systems with Electrostatic and Magnetostatic Interaction MICHAEL GREENFIELD, US Army Rsch Lab - Aberdeen, PAVEL GREENFIELD, Drexel University — Systems carrying electric charges and magnetic dipoles are widespread in nature and applications. Variational principles and methods play key role in modelling these systems, and they have been developed for a couple of centuries (see, Landau, L.D. and Lifshitz, E.M. *Electrodynamics of Continuous Media*, Pergamon, 1963). Nonetheless, even a quick glance at the literature shows that the variational approach remains unfinished. In particular, in terms of calculus of variations, all the studies are based on the analysis of first energy variations (i.e., analysis of ponderomotive forces and conditions of equilibrium.) The analysis of the second variation, the cornerstone of the stability analysis, is not even touched in a systematic manner. We partially fixed this gap in (Grinfeld, M., Grinfeld, P., *A Variational Approach to Electrostatics of Polarizable Heterogeneous Substances*, *Advances in Mathematical Physics*, Article ID 659127, 2015). In this paper, we present corresponding results relating to the problems of plasma physics.

Michael Greenfield
US Army Rsch Lab - Aberdeen

Date submitted: 12 Jul 2017

Electronic form version 1.4