Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Separating Heat and Cold by a Magnetic Body Force and the Principle for a Non-Carnot Engine WEILI LUO, JUN HUANG, University of Central Florida, TIANSHU LIU, Western Michigan University — A new type of heat engine has been proposed in 2005: A specifically designed magnetic body force can reverse heat flow from high temperature to low temperature [1]. This mechanism can drive heat to higher temperature, rendering the possibility to re-use the waste heat. As the result, the efficiency is much higher than that of the Carnot Engine. In a recent paper [2] a realization of this proposed mechanism is reported: by using a specific configuration of temperature and magnetic field gradients, we observed that magnetic body force suppresses the gravito-thermal convective heat when the gradients of temperature and field are anti-parallel to each other. This driving force stops the heat flow of approaching to thermal equilibrium in the system, causing the temperature difference across the sample to increase with applied fields. In this work, we will discuss the physics for the driving mechanism, the experimental results verifying the principle, its applications in energy and other industries [3], and its implication for fundamental thermodynamics law that is intimately related to the Carnot principle.
References: [1] Weili Luo, US Patent: WO 2007002127 A3 [2] Jun Huang, Weili Luo, and Tianshu Liu, (http://arxiv.org/abs/1611.00385) [3] Weili Luo et al. Patent pending.

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Date submitted: 25 Jan 2018 Electronic form version 1.4