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**Flow Structure Determined Enhancing and Inhibiting Convective Heat Transfers in Quasi 1D Magnetic Fluid** WEILI LUO, JUN HUANG, University of Central Florida, TIANSHU LIU, University of Western Michigan — We have found previously [1] that the convective flow in magnetic fluid responds to applied magnetic fields differently, depending on the relative direction of the gradient of temperature to that of the field. In this work we report the velocity profiles from these flows obtained from optical flow method. The peculiar magnetic driving force as well as the special configurations give rise to unique flow patterns, distinctly depends on the specific relative orientation of the temperature to that of field. The streamline plots indicate formation of local or global flow structures that explain the different effects of field on the heat transfer in the sample. For one configuration, the magneto-thermo convection causing the "heat" to be localized, stopping the equilibration process in the system [2]. We will discuss the different responses to the applied magnetic fields for two different sample configurations in terms of relative orientation of the temperature and field gradients. [1] Jun Huang and Weili Luo "Heat Transfer Through Convection in a Quasi-One-Dimensional Magnetic Fluid**."** Journal of Thermal Analysis & Calorimetry, 113, p449 (2013). **[2]** Jun Huang, T. Liu, and Weili Luo, preprint 2016

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