

Abstract Submitted  
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**Oscillatory Magnetogasdynamic Slip Flow in a Microchannel**

RAMESH AGARWAL, Washington University in St. Louis — The problem of pressure driven Magnetogasdynamic (MGD) slip flow with small rarefaction through a long micro-channel is considered. The flow is driven by steady or oscillatory pressure gradient. The study of MGD flows in microchannels is of great interest since they occur in magnetic thin films and other electromagnetic micro-scale devices. In obtaining the micro-fluidic solutions in the presence of a magnetic field, some additional physical, mathematical and numerical issues need to be considered. These issues deal with the scaling laws for micro-scale MHD flows and the relevant parameters such as Mach number, Reynolds number, Hartmann number, magnetic Reynolds number, and Knudsen number. For planar constant area micro-channel, it is possible to obtain the analytical solutions for both steady and oscillatory pressure driven flows. As physically expected, the higher value of the magnetic field (higher Hartmann number) flattens the velocity profile in the channel.

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