Abstract Submitted
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A Computational Investigation of Mixed Convection in Microscale Flows[1] RUSTEM BILYALOV, JOHN BAKER, University of Alabama — In order to study mixed convective heat transfer associated with flow in a vertical microscale channel, a two-dimensional computational model was used. A temperature difference was established in the direction normal to the flow by assuming that each of the channel walls is at a constant, but different temperature. The microscale geometry resulted in finite Knudsen number flows in the so-called slip flow regime. The Maxwell velocity-slip and temperature-jump boundary conditions were applied at the channel walls. The flow structure was visualized using contour plots of temperature and pressure as well as velocity vector plots. Flows corresponding to Knudsen numbers in the range of 0.01 through 0.1 and an Archimedes number in the range of 0.1 to 10 were considered. Mixed convective heat transfer, for both assisting and opposing conditions, was characterized using the Nusselt number.

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