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HEAT EXCHANGE THROUGH A MICROCHANNEL FOR AN EFFICIENT THERMAL MANAGEMENT

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Abstract. The constant advance in the development of electronic devices brings a reduction in their size and an increase in their power density. In contrast, new technologies to extract heat in more efficient ways are needed for cooling to ensure the performance and durability of these devices. Microfluidic devices with their decreasing hydraulic diameter and increasing surface area per unit volume are suitable candidates to integrate thermal architectures due to their high efficiency to dissipate heat. By performing simulations using the finite volume method with the OpenFoam software, we obtain the temperature map and the heat flow along the microchannel. We study different flow regimes and configurations of the external power source, in order to achieve an optimal dissipation.The results of these simulations are compared to experimental results obtained by the "Laboratorio de Microfluídica" of the group Medios Porosos (FIUBA), on PDMS-glass microfluidic devices with copper inserts, in order to model heat exchangers coupled to electronic systems.