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Heat transfer in turbulent bubbly flow in channels[1] SADEGH DABIRI, GRETAR TRYGGVASON, University of Notre Dame — In many applications convective heat transfer occurs in the presence of a multiphase turbulent flow such as in boilers and bubble column reactors. Turbulence in channel and pipe flows significantly increases the heat transfer rate. Here we examine the effect of turbulent bubbly flows on the heat transfer inside a vertical channel with uniform heat flux on the walls and compare it with the heat transfer in single phase flow. Both bubbles and the turbulence are fully resolved through Direct Numerical Simulation. The distribution of the bubbles in the channel is affected by the deformability of the bubbles. A wall-peaked distribution is observed for nearly spherical bubbles and a core-peaked distribution is observed for deformable bubbles. This change in distribution of the bubbles significantly affects the flow rate in the channel and the heat transfer rate as well. The results of heat transfer for different flow configurations are presented and compared to the heat transfer in a single phase channel flow.

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