LBM/DEM Simulation of Heat Transfer in Granular Suspensions

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Abstract

We present a coupled DEM/LBM model for heat transfer of granular materials immersed in a fluid, liquid or gas. The calculation of temperature fields is implemented using an adaptive Lattice Boltzmann method based on the heat equation. Two modes of heat transfer are taken into account : 1) thermal conduction in grain and fluid phases and 2) thermal convection in the fluid. We investigate the evolution of effective thermal conductivity in several examples using simulation on Representative Elementary Volumes.

Keywords: immersed granular materials, numerical modeling, Heat transfer, Lattice Boltzmann, DEM, Convection

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