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The effects of soft-sphere contact models on heat transfer to particles flowing over a heated surface AARON MORRIS, CHRISTINE HRENYA, The University of Colorado at Boulder, ZHIWEN MA, National Renewable Energy Laboratory, SREEKANTH PANNALA, Oakridge National Laboratory, TOM O'BRIEN, Retired — DEM simulations are performed for solid particles flowing around a heated surface. For moderately dense granular flows with enduring particle-wall contacts, particles in contact with the surface are warmed by conduction across the mutual contact area. Heat transfer may also occur via conduction through the interstitial fluid within the small gaps between particles and the wall. The conductive heat transfer depends on the specific contact model, i.e. Hertzian or linear spring dashpot (LSD), because such models determine the contact area and duration. In this work, we use MFIX DEM (an open source simulation tool developed at NETL) to simulate particles falling in crossflow around a heated cylinder. Heat transfer models for both contact conduction as well as conduction across the interstitial fluid are included in these simulations. We discuss how different collision models impact the heat transfer to the particles as well as the sensitivity to various model parameters. We also compare the heat transfer predicted by different contact conduction thermal models.

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