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The behavior of the temperature of small inertial particles in turbulent flow SAENSUK WETCHAGARUN, JAMES RILEY, University of Washington — Heat transfer between phases plays a crucial role in many multiphase flow problems, e.g., in multiphase combustion systems. We report on a study of heat transfer to/from small inertial particles in a turbulent flow using direct numerical simulation with computational grids up to 512^3 grid points. The ambient fluid is subject to a uniform mean temperature gradient; the particle concentration is assumed to be dilute, so that one-way coupling is assumed in both the momentum and the energy equations. Inertial particles for a range of Stokes and Nusselt numbers are considered. In addition, both ensemble-averaged statistics as well as subgrid-scale statistics are computed, and both Eulerian and particle-tracking reference frames are utilized. Considering subgrid-scale modeling, this analysis is used, e.g., for the *a priori* testing of models for the subgrid-scale Eulerian velocity and temperature fields as experienced by the inertial particles. In addition, the relationship between the fluid particle temperature statistics and the fluid particle velocity is explored, as well as the relationship between the inertial particle temperature statistics and the autocorrelation of the Eulerian temperature field experienced by the particle.

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