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Particle-laden Channel Flow with Strong Radiative Heating JACOB WEST, SANJIVA LELE, Stanford University — In particle-based solar receivers, dense particles in a turbulent flow are radiatively heated, and in turn transfer energy to a carrier fluid via convection. When the particle mass loading and radiative heating are large enough to cause $\mathcal{O}(1)$ changes in carrier gas density and viscosity, this coupling introduces additional effects on the turbulence, beyond the turbulence modulation expected in isothermal two-way coupled particle-laden flows. Using a multiphysics code to solve the coupled Navier-Stokes equations, radiative transport equation, and Lagrangian particle trajectories, we perform direct numerical simulation of an irradiated channel flow at low Reynolds number, using the point particle representation. In this study, we present turbulence statistics and the turbulence kinetic energy budget for this flow at various particle mass loading and incident radiation levels. Funding support provided by US Department of Energy (DOE), Predictive Science Academic Alliance Program (PSAAP) II Center at Stanford: DE-NA-0002373

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