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Radiative heating of a turbulent particle-laden flow: Effects of radiation regimes on turbulence dynamics ARI FRANKEL, HADI POURANSARI, GIANLUCA IACCARINO, ALI MANI, Department of Mechanical Engineering, Stanford University — Radiation transport modeling has become increasingly important in the design and analysis of advanced thermal-fluid systems such as particle solar receivers. However, the mechanism for the two-way coupling of radiation transport with turbulence and particle dynamics has not been explored. In this work we employed algebraic and differential radiation models in direct numerical simulations of turbulence particle-laden flows subject to external radiative sources. It is shown that different radiation regimes, from optically thin to opaque, lead to significantly different turbulence structures and particle aggregation.

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