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Collision statistics of inertial particles suspended in turbulent flows of low dissipation rates SANDIPAN BANERJEE, University of Delaware, ORLANDO AYALA, Old Dominion University, LIAN-PING WANG, University of Delaware — The collision rate of sedimenting droplets in turbulent flows is of great importance in cloud physics. Parameters like the collision efficiency and collision enhancement are key inputs for the calculation of growth in the size of the cloud droplets due to coalescence. In this presentation we report the collision statistics of particles in turbulent flows of low dissipation rates (in the range of 3 cm^2/sec^3-100 cm^2/sec^3) for three different particle-pair sizes. Due to the expensive nature of the simulations, it is a common practice to use the linear interpolation to estimate the collision efficiency enhancement (which is defined as the ratio of the collision efficiency in a turbulent flow to the collision efficiency without the flow). In this study, along with the collision statistics, we also examine the accuracy of the linear interpolation approximation by comparing it to simulation data, at arbitrary dissipation rates, obtained from a hybrid direct numerical simulation. Furthermore, we also report particle pair statistics such as the particle relative velocity and the radial distribution function. A study on the computational cost of the simulations is also included.

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