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Relative dispersion of inertial particles in fully developed turbulence: an experimental study MATHIEU GIBERT, Max Planck Institute for Dynamics and Self-Organization (MPIDS), International Collaboration for Turbulence Research (ICTR), HAITAO XU, MPIDS & ICTR, EBERHARD BODENSCHATZ, MPIDS, ICTR & LASSP, Cornell University — We report experimental results of the motion of tracer and non-tracer heavy particles obtained by 3-D Lagrangian particle tracking in a fully developed turbulent water flow between counter-rotating disks. The sizes of the non-tracer particles are of the order of the Kolmogorov length scale and their densities range from 2.5 to 7.8. In this study, we focus on the effect of inertia on the separation of two particles in turbulence. The inertia effect is characterized by the Stokes number, the ratio of a particle time scale (τ_p) to a flow time scale (τ_f). As the separation distance ($r(t)$) changes, the particle time scale remains the same, but the flow time scale increases with the length scale considered according to the classical K41 phenomenology as $\tau_f \propto r^{\frac{2}{3}}$. We relate the experimental observations to this scale-dependent Stokes number.

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