

Abstract Submitted
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Neutral and inertial particle acceleration in strained turbulence

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Research, FEDERICO TOSCHI, Eindhoven University of Technology — Turbulence
influences the transport and mixing of particles. We study the dynamics of parti-
cles in turbulent flows undergoing asymmetrically expanding straining by means of
direct numerical simulations. We investigate the accelerations of tracer and inertial
particles. We find a good agreement between tracer acceleration variance and the
prediction of rapid distortion theory. Furthermore we study how particle accelera-
tion probability density functions depend on the strain rate, the Stokes number,
and the Reynolds number. Acceleration variances of inertial particles are discussed
in the context of the formal solution of the equation of particle motion, and we
show that in strong straining the acceleration variance of particles with small Stokes
numbers can exceed that of tracer particles.

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