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Scaling laws for the timescales of quantities seen by evaporating droplets[1] VALENTIN GIDDEY, PHILIPP WEISS, DANIEL W. MEYER, PATRICK JENNY, IFD, ETH Zurich — We study statistical properties of the gas flow seen by dispersed evaporating droplets in homogeneous, isotropic, stationary turbulence. An accurate description of properties seen by particles is essential in any numerical method relying on the point-particle assumption. In this contribution we focus on their fluctuation timescales.

The timescale of velocity components seen by inertial particles was studied in the past[2] and displays the interesting N-shaped dependency on the particle Stokes number. For evaporating particles, a description of the gas temperature and species mass fractions seen by droplets is required in addition to the velocity to correctly predict the evaporation rate. No such investigation of seen scalar timescale is available in the literature.

The relevant statistics are computed from Direct Numerical Simulation data for different flow conditions[3]. We present physically motivated models and scaling laws for the timescales of scalars seen by inertial particles. The influence of preferential sampling is discussed as well.

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[2]Jung, *Physical Review E* 77, 016307 (2008)
[3]Weiss *et. al*, *Physics of Fluids* 30, 083304 (2018)

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