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Laboratory measurement of non-spherical particle rotation in turbulence: analysis in lab and local reference frames ANKUR BORDOLOI, EVAN VARIANO, University of California Berkeley — Small axisymmetric particles are known to show shape dependence in their rotational kinematics in homogenous isotropic turbulence. For example, Byron et al. (2015) demonstrated that, rod-shaped particles rotate very differently compared to disc-shaped ones. This motivates us to extend this understanding to finite-sized particles ($\sim$ Taylor microscale) by examining their rotation and alignment. We have overcome the experimental challenges that have heretofore prevented the simultaneous measurement of orientation and rotation of large particles. We present this method and report results for large cylinders from 2D3C stereoscopic PIV data. These preliminary results show that there is equipartition of particle enstrophy into spinning about each of the particle's local axes. In other words, there is no preference for rotation about a particle's symmetry axis. Time permitting, effects of size on rotation for Taylor microscale particles will also be discussed.

Ankur Bordoloi
University of California Berkeley

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