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**Precision measurements of deformations of flexible particles in turbulent flows** BARDIA HEJAZI, LEE WALSH, GREG VOTH, Wesleyan University — We measure the deformation of flexible particles in the flow of a turbulent conical Taylor-Couette flow and a vertical water tunnel which generates homogeneous isotropic turbulence. The particles are tetrads and are 3D printed from 2 different polymers, they are made up of 4 slender arms separated by the tetrahedral angle (approximately 109.5 degrees) connected at the center by a weak joint. The joints are made from a soft flexible polymer and the arms are made from a rigid polymer allowing all deformation to be concentrated at the flexible joint. The particles are 2cm in diameter and have an effective ellipsoid which is a sphere, thus under small deformations, the particle will rotate with the same rate as the fluid rotation rate. As a result, the relative velocity between the arm of the particle and the fluid is due to the strain component of the velocity gradient tensor which causes the particle arms to bend. We are able to measure the small arm deformations experienced by the particle using 4 high-speed, high-resolution cameras. The arm deformations are larger in the Taylor-Couette apparatus compared to the vertical water tunnel since we are able to use other fluids that are more viscous than water.

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