

Abstract Submitted
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Using deformable particles for single particle measurements of velocity gradient tensors BARDIA HEJAZI, MICHAEL KRELLENSTEIN, GREG VOTH, Wesleyan University — We examine the deformation of particles made of several slender arms in 2D simple shear and 3D turbulent flow. Measurements of the bending of several arms and the rotation rate of the particle allow us to extract the full velocity gradient tensor using a single particle. Normally to obtain the same information we would have to use a high density of tracer particles. We use multiple armed (ramified) particles because a single slender fiber is not deformed in a uniform velocity gradient. Measurements in a 2D simple shear flow using a particle free to rotate about a fixed position are used to validate the technique. We then explore the use of this method to measure coarse grained velocity gradients in a turbulent flow created by a jet array in a vertical water tunnel.

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