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Five Degree of Freedom Fluorescence Localization of Ellipsoidal Particles[1] CRAIG SNOEYINK, MD. ANISUL ISLAM, GORDON CHRISTOPHER, Texas Tech University — Symmetry breaking non-spherical particles can exhibit unique behavior when self-assembling due to increased degrees of freedom. For example, ellipsoidal particles on a fluid interface exhibit mesostructures that are dependent upon the both the contact angle of the ellipsoidal particle as well as the orientation. However, measuring the three dimensional position and orientation of these particles can be challenging. Here we present preliminary results on five degree of freedom fluorescence measurements of ellipsoidal particles on a fluid interface. Using the Bessel Beam Microscopy system and a novel compressed sensing based image analysis algorithm we will demonstrate 3D localization of ellipsoidal particles with 50 nm accuracy as well as pitch and yaw measurements with a resolution of 10 and 1 degrees respectively. We will discuss the technique as well as its implications for our understanding of non-spherical particle interactions and assembly at interfaces.

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