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X-ray tracer study of Rheology and Hydrodynamics of Fatty acids MENGNING LIANG, University of Illinois at Urbana Champaign, ROSS HARDER, IAN ROBINSON, University College London, UNICAT TEAM — In wormlike micelles, the breaking and reforming of the micelle rods and the shearing of the rods and between the carbon chains themselves result in a complex diffusive behavior with more than one characteristic time constant. This is one of the characteristics of a Maxwellian fluid. We have studied the rotational Brownian motion of an alumina crystal suspended in a fatty acid liquid. Synchrotron generated hard x-rays are used to do single particle tracking of the rotational orientation by tracking the Bragg intensity of alumina crystals in diffraction geometry. This technique allows the tracking of particles to sub-milliradian precision. We have observed multiple time scales of relaxation which is evidence of subdiffusive behavior.

Mengning Liang
University of Illinois at Urbana Champaign

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