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Single particle measurements of material line stretching in turbulence: Numerics SASKIA TYMPEL, University of Technology Eindhoven, STEFAN KRAMEL, Wesleyan University, FEDERICO TOSCHI, University of Technology Eindhoven, GREG VOTH, Wesleyan University, UNIVERSITY OF TECHNOLOGY EINDHOVEN TEAM, WESLEYAN UNIVERSITY COLLABORATION
— In three dimensional isotropic turbulence, particles in the shape of chiral dipoles display a preferential rotation direction. Chiral dipoles have two helical ends with opposite chirality that are connected by a straight rod. We assume particles to be small and neutrally buoyant, so that their centre of mass follows the same trajectories of tracer particles in homogeneous isotropic turbulence. First, we tune the model for dipoles spinning dynamics via Stokesian Dynamics simulations. Then, we compute the spinning dynamics around their preferential rotation axis in homogenous and isotropic turbulence using turbulent fields from high resolution DNS. Our numerics shows a very good agreement with experimental results and allow a deeper insight into the mechanisms of material line stretching in turbulence.

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