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Particle capture by drops in Turbulence ARASH HAJISHARIFI, CRISTIAN MARCHIOLI, University of Udine, ALFREDO SOLDATI, TU Wien — We examine the capture of sub-Kolmogorov inertial particles by deformable liquid droplets in dilute turbulent channel flow. To simulate this solid-liquid-liquid system, we exploit a Eulerian-Lagrangian methodology based on DNS of the Continuity, Navier-Stokes and Cahn-Hilliard equations and on the solution of the Lagrangian equation of particle motion. The carrier flow and the droplets have same density and viscosity. To model the particle-interface interaction, we consider a capillary force based on the liquid-liquid surface tension and the distance from the particle center to the nearest point on the fluid interface: This force is exerted only in close proximity of the (diffuse) interface and drives particle capture. Simulations with and without inter-particle collisions were performed to examine particle capture and subsequent accumulation at the interface, which are found to depend on the combined action of turbulence and particle inertia. Capture and trapping is higher for lower inertia particles, and accumulation is found to occur in the high-positive-curvature regions of the interface. This project has received funding from the European Unions Horizon 2020 research and innovation program under the Marie Sklodowska-Curie grant agreement No 813948.

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