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Dynamics of large and deformable bubbles in turbulence LABANCA GABRIELE, TU Wien, GIOVANNI SOLIGO, ALESSIO ROCCON, ALFREDO SOLDATI, TU Wien; University of Udine — The dynamics of large, deformable bubbles in a turbulent channel flow is investigated coupling direct numerical simulations of turbulence with the phase-field method (PFM). In the framework of the PFM a marker function (phase field) defines the local concentration of each phase; the phase field is uniform in the bulk of the phases and undergoes a smooth transition across the interface. All fluid properties are defined as proportional to the phase field. An interfacial term (based on the Korteweg tensor) in the Navier-Stokes equation accounts for the effects of a deformable interface on the flow field. We will present the effects of density and viscosity contrasts between the dispersed and the carrier phase at a constant shear Reynolds number, $Re_\tau = 300$ (ratio between inertial and viscous terms, defined on the channel half-height), and at a constant Weber number, $We = 1.5$ (ratio between inertial and surface tension forces). In particular, the effects of density and viscosity contrast between the two phase on the dispersed phase morphology (drop distribution, Sauter mean diameter, interfacial area) and the local flow field will be investigated and detailed.

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