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Phase segregation in multiphase turbulent channel flow[1] FEDERICO BIANCO, ALFREDO SOLDATI, Dep. Elect., Manag. and Mechanical Engineering, University of Udine — The phase segregation of a rapidly quenched mixture (namely spinodal decomposition) is numerically investigated. A phase field approach is considered. Direct numerical simulation of the coupled Navier-Stokes and Cahn-Hilliard equations is performed with spectral accuracy and focus has been put on domain growth scaling laws, in a wide range of regimes. The numerical method has been first validated against well known results of literature, then spinodal decomposition in a turbulent bounded flow (channel flow) has been considered. As for homogeneous isotropic case, turbulent fluctuations suppress the segregation process when surface tension at the interfaces is relatively low (namely low Weber number regimes). For these regimes, segregated domains size reaches a statistically steady state due to mixing and break-up phenomena. In contrast with homogenous and isotropic turbulence, the presence of mean shear, leads to a typical domain size that show a wall-distance dependence. Finally, preliminary results on the effects to the drag forces at the wall, due to phase segregation, have been discussed.

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