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The Lagrangian filtered mass density function (LFMDF) or LES/PDF method for turbulent two-phase flows SERGIO CHIBBARO, Université Pierre et Marie Curie Paris, JEAN-PIERRE MINIER, EDF R&D Chatou — In this talk, a new formalism for the filtered density function (FDF) approach is developed for the treatment of turbulent polydispersed two-phase flows in LES simulations. Contrary to the FDF used for turbulent reactive single-phase flows, the present formalism is based on Lagrangian quantities and, in particular, on the Lagrangian filtered mass density function (LFMDF) as the central concept. This framework allows modeling and simulation of particle flows for LES to be set in a rigorous context and various links with other approaches to be made. In particular, the relation between LES for particle simulations of single-phase flows and Smoothed Particle Hydrodynamics (SPH) is put forward. Then, the discussion and derivation of possible subgrid stochastic models used for Lagrangian models in two-phase flows can set in a clear probabilistic equivalence with the corresponding LFMDF. Finally, a first stochastic model will be proposed in this framework and numerical simulations will show the comparison of LES simulations against DNS.

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