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**Two-Way Coupled Euler-Lagrange Simulation on Mid-Field Spray under Multi-Physics Control**[1] KAI LIU, SIVARAMAKRISHNAN BALACHANDAR, University of Florida — This study performs two-way coupled Euler-Lagrange simulations on the mid-field liquid-gas round-jet spray, externally controlled by multi-physics strategies. The two-way coupled Euler-Lagrange methodology has been commonly used in simulating complicated multiphase flows containing huge number of dispersed particles. To further improve the simulation accuracy, fluid-mediated particle-particle interactions in sub-grid scale is rigorously evaluated by the pairwise interaction extended point-particle (PIEP) model. And the self-induced velocity issue is also suppressed by the self-induced correction (SIC) model. In this talk, we will first take sedimentation problem as an example to illustrate the effect of PIEP model and SIC model in optimizing Euler-Lagrange simulations. Then briefly valid the fundamental single-phase turbulent round-jet flow simulation according to experimental and theoretical statistics. Finally, Euler-Lagrange simulations incorporating these models will be demonstrated and compared with experiments. Hydrodynamic, electrostatic and ultrasonic controlling strategies will also be modelled to test their performance in changing the dispersion of spray droplets.

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