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Particle-laden flow past a cylinder resolved with IBM and overset grids JRGEN R. AARNES, NTNU, NILS E. L. HAUGEN, NTNU, SINTEF Energy Research, HELGE I. ANDERSSON, NTNU — Two different computational methods are used to resolve a bluff body in a cross flow, by using The Pencil Code software. The bluff body representations in this high-order finite-difference code for compressible DNS are: an immersed boundary method and an overset grid implementation. Strengths and weaknesses of the two methods are assessed, where computational cost and precision are of particular interest. Both methods are applied to a two-dimensional particle-laden flow simulation, where particles are convected towards and (possibly) past a circular cylinder at Reynolds numbers in the 2D vortex shedding regime. Particles impacting the cylinder are assumed to stick to the surface, and are removed from the simulation. The ratio of impacted to inserted particles is a measure of impaction efficiency, where particle Stokes number is a governing parameter. Both bluff body representations yield accurate impaction efficiencies, but the computational cost can be notably reduced by optimal choice of bluff body representation.

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