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Direct simulation of fluid-structure interaction with Blue¹ RICHARD V. CRASTER, Imperial College London, SEUNGWON SHIN, Hongik University, JALEL CHERGUI, DAMIR JURIC, LIMSI, CNRS, LYES KA-HOUADJI, OMAR K. MATAR, Imperial College London — The interaction of multiphase flows with complex solid geometries is directly simulated in *Blue* using a direct forcing technique (Fadlun, Verzicco, Orlandi & Mohd-Yusof, JCP 161 (2000) 35-60) in the broader context of the immersed boundary method. This capability has recently been introduced in *Blue* which is a solver for massively-parallel simulations of fully three-dimensional multiphase flows. Arbitrary solid shapes can be constructed or introduced in CAD format. These solid objects can then be treated as either static, in forced translational and/or rotational motion or in fully free motion with full two-way coupling to the fluid phases. We study the benchmark case of a simple solid sphere plunging into a liquid pool. In addition we present examples of more complex moving solid objects and their interaction with liquid-gas free-surfaces.

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