

Abstract Submitted  
for the DFD16 Meeting of  
The American Physical Society

**Simulations of Compressible Viscous Flows and Wave Scattering Using the Immersed Boundary Method<sup>1</sup>** WALTER ARIAS-RAMIREZ, UNICAMP-Univ de Campinas, BRITTON J. OLSON, Lawrence Livermore National Laboratory, LLNL, WILLIAM R. WOLF, UNICAMP-Univ de Campinas, UNIVERSITY OF CAMPINAS TEAM, LAWRENCE LIVERMORE NATIONAL LABORATORY TEAM — The immersed boundary method (IBM) in combination with a high-order finite difference compact formulation is used to study canonical test cases in fluid mechanics and acoustics, including viscous compressible flows, acoustic wave reflection and diffraction, and shock-wave reflections. In this study, two IB formulations are implemented: the continuous forcing and the discrete forcing approaches. Results obtained for the two methodologies are presented for 1-D problems involving acoustic and shock wave reflection, plane wave acoustic scattering along a cylinder and the viscous flow past a solid cylinder. Additionally, a grid convergence study is carried out for the simulations showing first-order convergence for the current implementation of the continuous forcing approach and second-order convergence for the discrete forcing approach.

<sup>1</sup>The authors acknowledge the financial support received from So Paulo Research Foundation, under grants No. 2016/00904-5, No. 2014/10166-6, No. 2014/24043-3, No.2013/03413-4, and the computational resources provided by the Lawrence Livermore National Lab.

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Date submitted: 28 Jul 2016

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