

Abstract Submitted  
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**Simulation of shock and detonation waves with Smoothed Dissipative Particle Dynamics** GÉRÔME FAURE, JEAN-BERNARD MAILLET, CEA, DAM, DIF, GABRIEL STOLTZ, CERMICS - INRIA — Smoothed dissipative particle dynamics (SDPD) is a mesoscopic method that allows one to select the level of resolution at which a fluid is simulated. The consistency between these different resolutions has been shown in a previous work. While Molecular Dynamics (MD) is limited to time and length scales much smaller than the ones involved in experimental observations, SDPD enables us to simulate complex phenomena at much larger scales. We present here some applications of SDPD to non-equilibrium situations such as shock waves and micro-jetting. We also introduce a reactive mechanism in which chemical reactions are taken into account by means of a progress variable attached to each particle and allowing to change the equation of state as the reaction occurs. This allows us to handle exothermic chemical reactions and perform simulations of detonations waves.

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