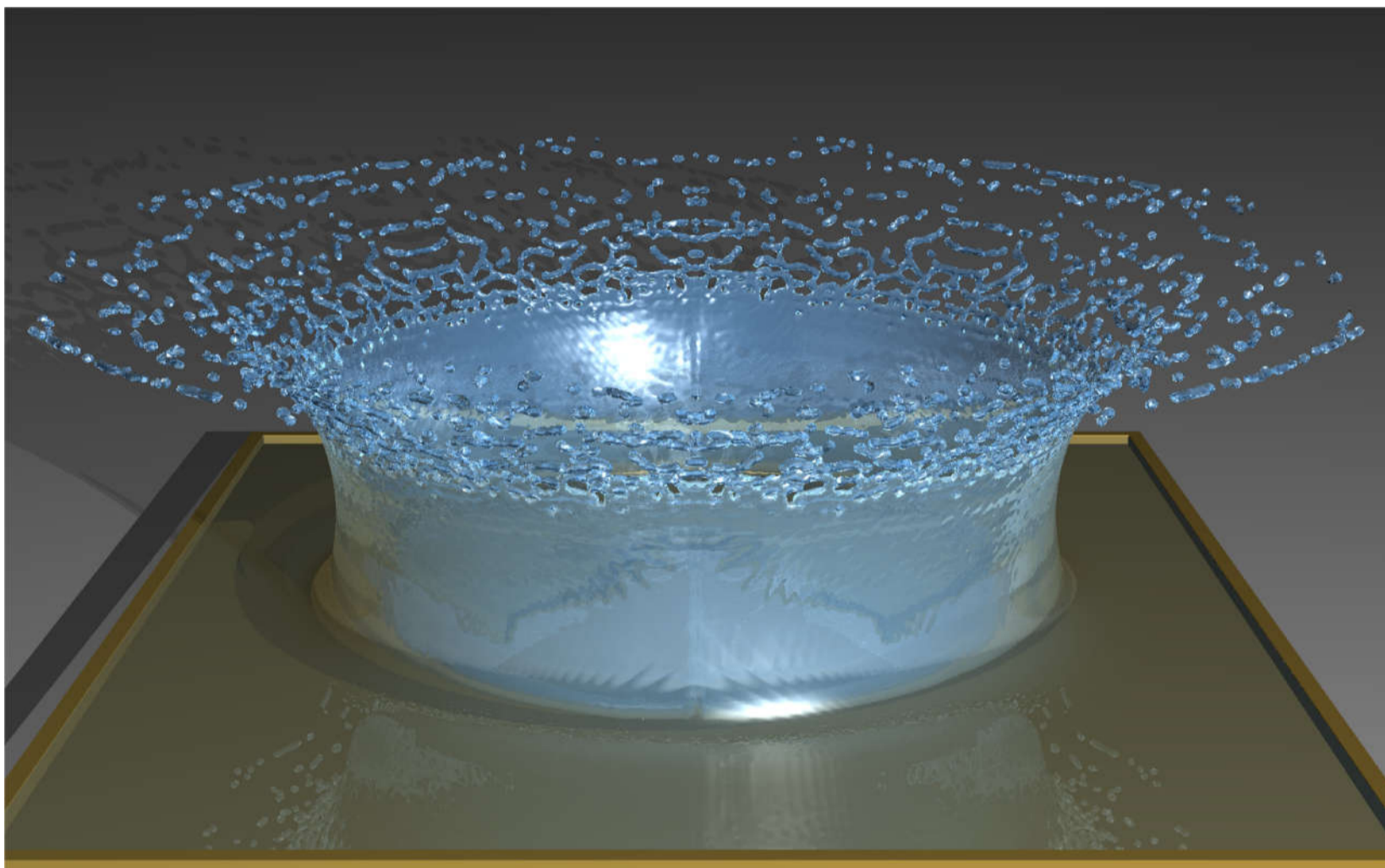# Meshless Discretization of a Continuum
fluid Model - the SPH method

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Meshless methods obviate the need to construct meshes thus allowing simulations involving severe geometric deformations. Smoothed Particle Hydrodynamics (SPH) is a meshless particle based Lagrangian numerical method that has been in development for the past three decades with a wide range of applications. We have proposed improvements to the existing SPH algorithm, specifically its incompressible variant, to simulate free surface flows with interacting solids. We also discuss various challenges in implementing the incompressible SPH algorithm. By performing a theoretical analysis, we demonstrate a volume conservation error in the method. This is equally applicable to other meshfree particle based methods. We propose a deformation gradient based algorithm for better volume conservation.