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Simulations of Structured, Reduced-Mass Liquid Targets for High-Repetition-Rate Laser-Plasma Interactions[1] JOSEPH SMITH, Ohio State Univ - Columbus, JOSEPH SNYDER, Miami Univ - Hamilton, SCOTT FEISTER, California State University Channel Islands, JOHN MORRISON, Innovative Scientific Solutions, Inc., GREGORY NGIRMANG, National Academies of Sciences, Engineering, and Medicine, ENAM CHOWDHURY, CHRIS ORBAN, Ohio State Univ - Columbus — Micron-scale liquid droplets synchronized with an intense laser system provide a free-standing, reduced-mass target for high-repetition rate laser plasma interactions. We show that colliding two droplets can produce new geometries including reduced-mass sheet and tube-like targets that may be beneficial for ion acceleration and other applications. We present computational fluid dynamics (CFD) simulation results modelling the collision of two droplets and compare it to previous experimental measurements [Pan et al. 2009, Phys. Rev. E] with the same Weber number (a dimensionless number describing the relationship between inertia and surface tension in the collision). We then present particle-in-cell (PIC) simulation modeling laser plasma interactions with target geometries based on the CFD simulation result and discuss the possibilities of this type of target for high-repetition-rate interactions.

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