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PIC Simulations of particle energization during magnetic reconnection of laser produced plasma bubbles KAI GERMASCHEWSKI, JOHN DONAGHY, Univ of New Hampshire, WILL FOX, DEREK SCHAEFFER, AMITAVA BHATTACHARJEE, JACKSON MATTEUCCI, Princeton Plasma Physics Laboratory, GENNADY FIKSEL, University of Michigan — We perform and analyze particle-in-cell simulations of colliding laser-produced plasma bubbles. These end-to-end simulations model generation and heating of the bubbles, which by means of the Biermann battery effect self-consistently generate magnetic fields. The anti-parallel fields then collide and reconnect. Previous 2-D simulations in the reconnection plane demonstrate the formation of an energized electron population during reconnection [W. Fox, PoP 24, 092901 (2017)]. Here we expand the calculations to the full 3-D evolution of colliding plasmas to determine the conditions required in this more complete system to accelerate particles. We also investigate the effect of a pre-heated electron population on particle energization. Simulations are performed using the GPU-enabled PSC particle-in-cell code on ORNL's Summit supercomputer.

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