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Laser-driven magnetic reconnection in the multi-plasmoid regime SAMUEL TOTORICA, TOM ABEL, Stanford, KIPAC, SLAC, FREDERICO FIUZA, SLAC — Magnetic reconnection is a promising candidate mechanism for accelerating the nonthermal particles associated with explosive astrophysical phenomena. Laboratory experiments are starting to probe multi-plasmoid regimes of relevance for particle acceleration. We have performed two- and three-dimensional particle-in-cell (PIC) simulations to explore particle acceleration for parameters relevant to laser-driven reconnection experiments. We have extended our previous work [1,2] to explore particle acceleration in larger system sizes. Our results show the transition to plasmoid-dominated acceleration associated with the merging and contraction of plasmoids that further extend the maximum energy of the power-law tail of the particle distribution. Furthermore, we have modeled Coulomb collisions and will discuss the influence of collisionality on the plasmoid formation, dynamics, and particle acceleration. [1] Totorica, S. R., T. Abel, and F. Fiuza, Physical Review Letters, 116, 095003 (2016). [2] Totorica, S. R., T. Abel, and F. Fiuza, Physics of Plasmas, 24, 041408 (2017).

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