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Stable quasi-monoenergetic ion acceleration from the laser-driven shocks in a collisional plasma SHIKHA BHADORIA, NAVEEN KUMAR, CHRISTOPH H. KEITEL, Max Planck Institute for Nuclear Physics — Effect of collisions on the shock formation and subsequent ion acceleration from the laser-plasma interaction is explored by the means of particle-in-cell simulations. In this setup, the incident laser pushes the laser-plasma interface inside the plasma target through the hole-boring effect and generates hot electrons. The propagation of these hot electrons inside the target excites a return plasma current, leading to filamentary structures caused by the Weibel/filamentation instability. Weakening of the space-charge effects due to collisions results in the shock formation with a higher density jump than in a collisionless plasma. This results in the formation of a stronger shock leading to a stable quasi-monoenergetic acceleration of ions.

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