

Collisionless Shockwaves Formed by Two Counter-Streaming Plasmas

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Abstract: Shockwaves and filaments are observed in the interactions of laser-produced counter-streaming plasmas on the Shenguang II laser facility. Our hydrodynamic and particle-in-cell simulations indicate that the shockwaves excited at early stage are collisionless and caused by the electrostatic instability, and the filaments at late stage may be due to Weibel type instability. The dimensionless parameters calculated with the experimental results suggest that the observation is in the regime where scaling to the supernova remnants is possible.

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