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Nonlinear structures in a plasma with charged debris and nonthermal electrons

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In this work, we investigate the nonlinear structures excited by moving external charged debris in a collisionless, unmagnetized plasma with thermal ions and Cairns-distributed electrons. The results indicate that the interplay between the debris motion and the nonthermal electron population strongly influences the properties of such structures. Our findings provide new insights into debris-plasma interactions and demonstrate the importance of nonthermal electron distributions in shaping nonlinear wave dynamics, with relevance to both laboratory and space plasma environments.

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