



## **Strong interplay between superluminescence and radiation friction during direct laser acceleration of electrons**

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Even though direct laser acceleration at ultra-high intensities has been extensively studied, the impact of superluminescence on electron dynamics remains relatively unknown. The superluminescence (phase velocity larger than the speed of light) is unavoidable during laser propagation through a plasma and therefore must be taken into account. We have examined direct laser acceleration of electrons within a static magnetic filament driven by a high-intensity laser within a plasma. We studied the regime where the electrons also

experience the force of radiation friction caused by emission of electromagnetic radiation. We found that the interplay of superluminescence and radiation friction manifests as an attractor effect: the electrons with various initial energies reach roughly the same maximum energy and emit the same power in the form of gamma rays. The discovered effect is directly relevant to laser-plasma interactions at high-intensity multi-PW laser facilities.

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