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**Stochastic heating in laser interaction with ultra-thin foils** JOANA LUIS MARTINS, EVANGELOS SIMINOS, TUNDE FULOP, Department of Physics, Chalmers University of Technology, 41296 Gothenburg, Sweden — Stochastic heating of electrons in multiple counter-propagating electromagnetic waves has been investigated theoretically and numerically in numerous works since the 80s [e.g. Mendonça & Doveil, JPP 28, 485 (1982)].
Stochastic heating has been invoked as a possible mechanism responsible for electron heating in scenarios such as laser interaction with thin foils for ion acceleration and electron heating in beat-wave injection. However, a clear experimental verification of this heating process has not been done, to our knowledge.
In this work, we examine electron heating during the interaction of multiple laser pulses with ultra-thin foils (a few atomic layers wide) through numerical particle-in-cell and particle-particle simulations. Such targets could prevent the development of instabilities/processes which could hinder the interpretation of observations. We include realistic temporally and spatially finite laser pulses and targets and explore in detail possible setups for an experimental observation of stochastic heating, analyzing signatures in the electron energy spectra, angular distribution, and radiation emission.

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