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Collisionless stochastic electron heating in a plasma slab ALEXEY AREFIEV, VLADIMIR KHUDIK, Institute for Fusion Studies, The University of Texas at Austin — We find the rate and the saturation energy for stochastic collisionless electron heating by an AC field in a plasma slab. The work is motivated by "two-sided" vacuum heating of radially moving electrons in laser-irradiated microclusters [1]. We consider an ideally conducting slab that freely emits electrons in an AC electric field. The interaction of an emitted electron with the field is analogous to a 1D random walk in velocity space, with the time between the walk steps proportional to the travel time through the slab ($t_s \sim 1/|v|$). The resulting increase of the average electron energy is slower than previously expected (t^2) [1] because of long delays between the interactions for slower electrons. The heating saturates when a considerable number of electrons reach a velocity limit where the Chirikov resonance-overlap criterion is not satisfied. The velocity saturation might alter the resonant heating mechanism proposed in [2], since the travel-time t_s at the limiting velocity can significantly exceed the period of the AC field. [1] Phys. Plasmas 12, 056706 (2005); [2] Phys. Plasmas 12, 056703 (2005).

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