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Stochastic heating of plasmas by electron collisions with randomized laser light MARK SHERLOCK, Lawrence Livermore Natl Lab — Using numerical simulations, we show that plasmas will absorb energy from lasers by the non-linear motion of electrons interacting with small-scale, random intensity non-uniformities. The necessary conditions for this mechanism arise when multiple speckled lasers overlap, as occurs in laser fusion hohlraums. Stochasticity emerges as a result of chaotic particle trajectories, leading to scattering of electrons in the laser fields at a rate which can exceed the Coulomb scattering rate for typical laboratory parameters. We focus our calculations on the laser overlap region of the National Ignition Facility, where the absorption rate is predicted to exceed the inverse bremsstrahlung rate by a factor of twenty-five at peak power. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344, and release LLNL-ABS-812057.

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