

Abstract Submitted
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Dynamic Sheath Formation and sub-THz Radiation Emission from Laser-Metal Interactions¹ ASHER DAVIDSON, BEN ROCK, GEORGE PETROV, LUKE JOHNSON, DAN GORDON, BAHMAN HAFIZI, JOE PENANO, United States Naval Research Laboratory — We are investigating secondary radiation from a short pulse laser with mJ energy incident on a metal surface. The electrons absorb energy from the laser pulse, increasing in temperature and resulting in some electrons at the tail of the Fermi-Dirac distribution function to overcome the work function barrier. The resultant electron motion at the surface contributes to a surface current, which in turn sources secondary radiation emission. The traditional thermionic emission picture breaks down due to Coulombic effects and therefore a modified emission model is presented. Previous precedence exists for the modified thermionic emission models for laser-metal interactions of a similar nature, such as one presented by Rife et., al [J. Opt. Soc. Am. B, Vol. 10, p.1424 (1993)]. Surface currents generated by such a mechanism are modeled with a Particle-In-Cell (PIC) simulation and their implication on the sourcing of microwave radiation is discussed. The predictions of our model in its relation to recent experiments is also discussed.

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