

Abstract Submitted  
for the DPP16 Meeting of  
The American Physical Society

**Inverse Bremsstrahlung Heating in Laser-Matter Interactions:  
the effects of other particles**<sup>1</sup> RISHI PANDIT, Southern Illinois University  
Edwardsville, IL, YASUHIKO SENTOKU, University of Nevada Reno, EDWARD  
ACKAD, Southern Illinois University Edwardsville, IL — The laser-matter inter-  
action of inverse bremsstrahlung heating is studied via a particle in cell code, PI-  
CLS and via molecular dynamics code, MD. Inverse bremsstrahlung heating, an  
important process in the laser-matter interaction, involves three different kinds of  
interactions, i) the interaction of the electrons with the external laser field, ii) the  
electron-ion interaction and iii) the electron-electron interaction. In the interaction  
of atomic clusters with femtosecond laser pulses, nanoplazmas with high density are  
created. A new scaling for the rate of energy absorption in inverse bremsstrahlung  
heating has been derived which depends on the external laser field as well as electric  
field due to the other particles. Electric fields due to the particles depend on a pa-  
rameter, the potential depth. Thus, inverse bremsstrahlung heating also depends on  
potential depth. We will discuss the particle in cell code results and molecular dy-  
namics code results by varying laser intensities and potential depths to understand  
the effect of potential depth as well as the particles fields dependence of inverse  
bremsstrahlung heating in laser-matter interaction.

<sup>1</sup>This work was supported by Air Force Office of Scientific Research under AFOSR  
Award No. FA9550-14-1-0247.

Rishi Pandit  
Southern Illinois University Edwardsville, IL

Date submitted: 14 Jul 2016

Electronic form version 1.4