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Effects of Soft-Core Potentials and Coulombic Potentials on Bremsstrahlung Radiation during Laser Matter Interaction[1] RISHI PANDIT, Department of Physics, Southern Illinois University Edwardsville, IL, YASUHIKO SENTOKU, Institute of LaserEngineering, Osaka University, Osaka, Japan, HIROSHI SAWADA, Department of Physics, University of Nevada, Reno, NV, LORA RAMUNNO, Department of Physics, University of Ottawa, Ottawa, Canada , EDWARD ACKAD, Department of Physics, Southern Illinois University Edwardsville, IL — An intense, short laser pulse incident on rare-gas clusters can produce nano-plasmas containing energetic electrons. As these electrons undergo scattering, both from phonons and ions, they emit bremsstrahlung radiation. Here we compare a theory of Bremsstrahlung emission appropriate for the interaction of intense lasers with matter using soft-core potentials and coulombic potential. A new scaling for the radiation cross-section and Emissivity via bremsstrahlung are derived for soft-core potential which depends on the potential depth, used to avoid coulomb singularity and for coulombic potential and implemented in a particle in cell code (PICLS). The radiation cross-section and emissivity via bremsstrahlung is found to increase rapidly with increases in potential depth up to 100 eV and then becomes mostly saturated for larger depths of a soft-core potential. For both cases, the radiation cross-section and emissivity of Bremsstrahlung increases with increases in laser wavelength. The bremsstrahlung emission may provide a broadband light source for diagnostics.

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