

Abstract for an Invited Paper
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Inverse Bremsstrahlung and High Harmonic Generation in Clusters and Molecules¹

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Clusters exposed to radiation from an intense VUV free-electron laser have been observed to absorb copious amounts of energy, which has been somewhat of a surprise. Different models by competing theory groups have proposed more than one mechanism for the energy absorption. We have studied the effect of incorporating a realistic atomic screening potential on the free-free or inverse bremsstrahlung absorption rate, and found important differences that emerge, compared to simpler hydrogenic models that are frequently adopted. In a separate project to be discussed at the meeting, some of the physical issues involved in high-harmonic generation from diatomic and polyatomic molecules will be assessed. These include the importance of treating the electron scattering from the molecular ion at a nonperturbative level of approximation, as well as the possible role of Jahn-Teller physics when the molecule possesses a high degree of symmetry. This theoretical project involves collaborative contributions from Zachary Walters, Stefano Tonzani, and Robin Santra.

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