## Abstract Submitted for the NES05 Meeting of The American Physical Society

Angular Dependent Interaction of He $_2^*$  ON He $_N$  Droplet Surfaces RAGHURAM PETLURI, JAN NORTHBY, Department of Physics, University of Rhode Island — A Metastable helium molecule is produced in a helium nanodroplet by electron bombardment and rise to the droplet surface. After equilibration, absorption of an infrared photon detaches it from the droplet surface. It is subsequently detected when it reaches a nearby metal surface and emits an electron. The spectral peaks studied in the region of the  $a^3\Sigma_u^+ \to c^3\Sigma_g^+$  transition are found to be shifted by  $\sim 2.6 {\rm cm}^{-1}$  from their corresponding free molecular transition values. In addition the lines are sharp, well resolved, and highly structured as a result of the interaction of the molecule with the droplet surface. We propose a model to explain the spectral shifts and line shapes on the basis of perturbation theory and Frank-Condon principle.

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