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Analysis of the response of atomic clusters to static electric fields in terms of position-dependent polarizabilities[1] KOBLAR A. JACKSON, MINGLI YANG, Department of Physics, Central Michigan University, Mt. Pleasant, MI 48859, JULIUS JELLINEK, Chemistry Division, Argonne National Laboratory, Argonne, IL 60439 — To explore in detail the response of atomic clusters to external electric fields, we have developed a method to compute position-dependent polarizabilities (PDP's). The essence of the method is to partition the overall cluster dipole into local, atom-centered contributions. The local moments are naturally decomposed further into charge-transfer and dipole components. This decomposition furnishes added insight into the response behavior of the clusters. By tracking the changes in the local moments with an external field, we arrive at the PDP's. In this talk we will present the details of the method and will compare and contrast different approaches to computing the local moments. We will also discuss results for Na_n, Si_n and Ar_n as a function of cluster size. These results show strong qualitative similarities in the response of Na_n and Si_n clusters, including clear evidence for metallic screening of the cluster interiors.

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