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Electron-correlation induced blue-shift of oscillator strength in photoabsorption by clusters HIMADRI CHAKRABORTY, Northwest Missouri State University, Maryville, MO 64468, MOHAMED MADJET, Freie Universitaet, 14195 Berlin, Germany, STEVE MANSON, Georgia State University, Atlanta, GA 30303 — We performed investigations on the role of electron correlations in the photoabsorption of several sodium metal-clusters and fullerenes. We describe the electronic structure of the valence electron cloud by the Local Density Approximation (LDA) after representing the residual ions by a classical spherical jellium background. The response of the system to an external electromagnetic field is calculated by an independent particle (IP) LDA scheme that completely disregards electron-electron correlations. For all systems considered the IP result of photoabsorption cross section is characterized by predominant oscillator strength (OS) density below the first ionization threshold, the discrete part of the spectrum. We carried out separate calculations by appropriately including the electron correlation in a time dependent LDA frame. The resulting absorption cross sections generically indicate the transfer of OS density above the first ionization threshold as a direct consequence of the correlation. The blue-shifted OS density forms the plasmon resonances, the character of which, however, depends on the specifics of geometry and size of the system.

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