



Understanding the spectra of few electrons confined in a quasi-one-dimensional nanostructure

Tokuei Sako

Nihon University, Funabashi, Chiba, JAPAN

and

Geerd HF Diercksen

Max-Planck-Institut für Astrophysik, Garching, Germany

The energy spectra and wave functions of two and three electrons confined by a quasi-one-dimensional Gaussian potential have been calculated and analyzed for three regimes of the strength of confinement ω_z , namely, large ($\omega_z = 5.0$), medium ($\omega_z = 1.0$) and small ($\omega_z = 0.1$) by using the full configuration interaction method and cartesian anisotropic Gaussian basis sets. For large and medium ω_z the energy spectrum shows a band structure which is characterized by the polyad quantum number v_p while for small ω_z it is characterized by the extended polyad quantum number v_p^* . The energy levels for small ω_z form nearly degenerate multiplets. The wave functions have been assigned uniquely by counting the number of *nodal planes*. Effects of anharmonicity in the confining potential on the energy spectra and wave functions have been also examined.