Abstract Submitted
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Few-electron anisotropic quantum dots in low magnetic fields: exact-diagonalization results for excitations, spin configurations, and entanglement[1] CONSTANTINE YANNOULEAS, UZI LANDMAN, School of Physics, Georgia Institute of Technology — Following earlier studies[2] for $N = 2 - 3$ electrons, exact-diagonalization calculations for $N = 4 - 6$ electrons in anisotropic quantum dots, covering a broad range of confinement anisotropies and strength of inter-electron repulsion, will be presented for zero and low magnetic fields. The excitation spectra are analyzed as a function of the magnetic field and of quantum-dot anisotropy. Analysis of the many-body wave functions through spin-resolved two-point correlations reveals that the electrons tend to localize forming Wigner molecules (WMs). For strong anisotropy, the WMs acquire a linear geometry, and the wave functions with a total spin projection $S_z = (N - 2)/2$ are similar to the strongly entangled W states. For intermediate anisotropy, the WMs exhibit a more complex structure. The degree of entanglement can be quantified through the use of the von Neumann entropy.

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[2]Y. Li, C. Yannouleas, and U. Landman, arXiv:0710.4325v1 [Phys. Rev. B (2007), in press]; C. Yannouleas and U. Landman, Rep. Prog. Phys. **70**, 2067 (2007)

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