Beyond the maximum density droplet: From few-electron to many-electron quantum dots in strong magnetic fields\textsuperscript{1} YUESONG LI, CONSTANTINE YANNOULEAS, UZI LANDMAN, School of Physics, Georgia Institute of Technology — Using the method of breaking of circular symmetry and of subsequent symmetry restoration via projection techniques, we present calculations for the ground-state energies and excitation spectra of \( N \)-electron parabolic quantum dots in strong magnetic fields in the medium-size range \( 10 \leq N \leq 30 \). The physical picture suggested by our calculations is that of non-rigid rotating Wigner molecules (RWM’s) comprising multiple rings, with the rings rotating independently of each other. A quasi-classical expression for the energetics of such non-rigid multi-ring RWM’s is derived; it is applicable to arbitrary sizes given the corresponding equilibrium configuration of classical point charges.

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