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Quantum statistics for a finite number of polarons in a neutralizing background FONS BROSENS, S.N. KLIMIN, J.T. DEVREESE, Universiteit Antwerpen — The ground state energy of an N-polaron system, confined to a spherical quantum dot with a neutralizing background charge, is investigated within an all-coupling many-body path-integral variational principle, taking into account both the Fermi statistics of the polarons and the electron-electron interaction. The treatment of the ground-state energy is performed for both closed-shell and open-shell systems. The average fermion density in the neutral spherical dot is characterized by the Wigner-Seitz parameter r_s. For a sufficiently large but finite number of polarons, the dependency of the ground state energy on r_s is similar to that for a polaron gas in bulk. Herefrom, we can conclude that the ground state properties of a polaron gas in bulk can be qualitatively described using a model of a finite number of polarons in a confinement potential provided by a neutralizing background charge.

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