

Abstract Submitted
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The canonical ensemble revisited: a projection operator approach

WIM MAGNUS, Universiteit Antwerpen / Imec, FONS BROSENS, Universiteit Antwerpen, CONDENSED MATTER THEORY TEAM, THEORY OF QUANTUM SYSTEMS AND COMPLEX SYSTEMS TEAM — Constraining the particle number N in the canonical ensemble hampers the systematic calculation of the partition function Z_N for non-interacting fermions and bosons, unlike in the case of the grand-canonical ensemble. Recently, we have shown that this task can be accomplished by invoking a projection operator that automatically imposes the particle number constraint in the many-particle Hilbert space. As a result, an integral representation is obtained for Z_N , as well as for the two-point and four-point correlation functions. As an illustration, the Helmholtz free energy and the chemical potential are calculated for a two-dimensional electron gas typically residing in the inversion layer of a field-effect transistor.

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