Ergänzungen zum ÖPG Tagungsband 1999

Kurzfassung des Hauptvortrags H5:


AT0000197

Quantum computing with Josephson junction circuits

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In superconductors, the phase of the order parameter and the number of Cooper pairs are non-commuting quantum variables. Josephson junctions couple the phases of neighbouring islands, while the Coulomb charging energy tends to fix the number of Cooper pairs on each island. With lithographic nanotechniques one can fabricate circuits with small area Josephson junctions where the coupling energy and the charging energy are of similar order of magnitude. Quantum superpositions of charge states can be realized; for circuits that contain loops it is also possible to realize superpositions of phase states. The potential of Josephson circuits for quantum computation will be discussed.


AT0000198

Verspätete Posterbeiträge der Haupttagung:

P118

A rapidly converging algorithm for solving the Kohn-Sham and related equations in electronic structure theory

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We describe a rapidly converging algorithm for solving the Kohn--Sham equations and equations of similar structure that appear frequently in calculations of the structure of inhomogeneous electronic many--body systems. The algorithm has its roots in the Hohenberg-Kohn theorem and solves directly for the electron density; single-particle wave functions are only used as auxiliary quantities. The method has been implemented for symmetric "slabs" of jellium as well as for spherical jellium clusters. Starting from very rough guesses for the initial electron density, convergence is reached within a few iterations.

This work was supported, in part, by the Austrian Science Fund under project P11098-PHY, and by the National Science Foundation under grant No. DMR-9509743.