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Title: Pekar's Ansatz and the Ground-State Symmetry of a Bound Polaron

Abstract: The Fröhlich polaron is a model of an electron interacting with the quantized optical modes (phonons) of an ionic crystal, and it has received considerable attention over the years as a toy model in quantum field theory. We shall consider a Fröhlich polaron bound in a symmetric Mexican hat-type potential. In the strong-coupling limit, the ground-state energy is given (to a leading order) by Pekar's minimization problem. Furthermore, for all values of the coupling parameter, the ground state is unique and therefore invariant under rotations. We show, however, that all the minimizers of the corresponding Pekar problem are nonradial. Moreover, assuming the nonradial minimizers are unique up to rotation, we prove in the strong-coupling limit that the radial electron density of the ground state converges in a weak sense to a rotational average of the densities of the minimizers.