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Large Polaron Systems and Bogolubov theory

In this talk we are concerned with the 'neutral' case of the many-polaron system in the Pekar-Tomasevich approximation. In 2015, Benguria, Frank and Lieb showed that in this case the ground state energy goes as $-N^{7/5}$ for large N. They proved an upper bound for the coefficient and conjectured it to be the correct one. In a joint work with Rupert Frank, we establish that this is indeed true by proving the corresponding lower bound. To do so, we study a one-component charged Bose gas with Coulomb interaction and a background with variable charge distribution. Adapting methods of Lieb and Solovej we can justify Bogolubov theory for this model.