

QUANTITATIVE PROPERTIES OF MULTI-POLARON SYSTEMS

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We review some recent results about multi-polaron systems described either by the Fröhlich Hamiltonian (quantized field) or by the Pekar approximation (classical field). We prove that if the Coulomb repulsion U between the electrons is large compared with the attraction α of the polarization field, there is no multi-polaron binding of any kind [1, 2]. We study this binding-unbinding transition in detail [3] and discuss symmetry properties of the ground state in the binding regime [4], proving conjectures by Spohn. As a second topic, we complement a result of Griesemer–Møller that there is many-body collapse for $U < 2\alpha$ by showing that thermodynamic stability holds for $U > 2\alpha$.

Keywords: Polaron, absence of binding, stability, thermodynamic limit

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