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ASYMPTOTIC COMPLETENESS FOR $N \leqslant 4$ PARTICLE SYSTEMS WITH THE COULOMB-TYPE INTERACTIONS

I. M. SIGAL AND A. SOFFER

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1. Introduction. In this paper we study the scattering theory for many-body long-range systems. It was known since the foundation of quantum mechanics that the scattering theory for long-range systems is different from that for the short-range ones. However, only when one addresses the problem of many-body asymptotic completeness does one realize the extent of this difference. We discuss the latter within the framework of phase-space analysis, which is the only approach which so far has given access to the long-range many-body problem.

There are two new problems one faces in passing from short-range systems to long-range ones. First, one has to prove sharper propagation estimates, namely, to show that in a certain sense there is no propagation outside a parabolic conical neighbourhood of the subset of the extended phase-space (i.e. including the time and energy axes) determined by the classical trajectories of quantum-mechanically

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