Abstract

Plenary

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Unitary propagator for N-particle Schrödinger equations in an external field. Existence, uniqueness and regularity

We report two sets of sufficient conditions for a unique existence of unitary propagator which possesses a "nice convenient" dense invariant subspace for time-depenent Schrödinger equations for N non-relativistic quantum particles in a (classical) electro-magnetic field.

The first is a time dependent perturbation of classical results of Leinfelder-Simader or Iwatsuka on the selfadjointness and assumes that every time freezed Hamiltonian $H(t)$ is as in their theorems however, that time derivative of the Hamiltonian $\partial_t H(t)$ is bounded by $H(t)$ in the sense of operator or of quadractic form, which implies that $H(s)$ is a perturbation of $H(t)$.

The second assumes that an external field is smooth and grows moderately at spatial infinity so that instantanenous recurrence of singularities cannot happen. This allows time derivatives of inter-paticle potentials to have stronger singularities which may not be form-bounded by the Hamiltonian.

First result is proved via the abstract theory of temporally inhomogenous semi-groups and the second via more harmonic analysis type argument, Strichartz estimates for vector valued functions, in particular.