Time dependent scattering theory for Hamiltonian systems and applications to transition state theory.

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Abstract:

Many problems in theoretical chemistry and astronomy are modeled by a dynamical system subject to a perturbation which is localized in time (e.g. a planet perturbed by the passage of another body, a molecule affected by a quasi-collision or a pulse of light).

We show that there is an efficient classical description very similar to scattering theory. We show that, under mild conditions, there is a smooth symplectic mapping that gives the state asymptotic in the future as a function of the state asymptotic in the past. Furthermore, there are very efficient perturbation theories. We study how all this can be used to understand geometric objects appearing in "transition state theory". This is joint work with D. Blazevski