

The thesis discusses quantum scattering theory and its application on reactive collisions of two atoms and ions in the local approximation. These reactions significantly influenced the evolution of the early Universe. Specifically the thesis deals with inelastic cross sections of two associative detachment processes of Li^- with H and Li with H^- . Potential energy surfaces were calculated by using the MOLPRO package of ab initio programs. Numerov method was used to solve radial Schrödinger equation with a local complex potential. Cross sections were computed from a complex phase shift determined from asymptotic condition.