



Nuclear Theory

Role of quark-interchange processes in evolution of mesonic matter

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We divide the cross section for a meson-meson reaction into three parts. The first part is for the quark-interchange process, the second for quark-antiquark annihilation processes and the third for resonant processes. Master rate equations are established to yield time dependence of fugacities of pions, rhos, kaons and vector kaons. The equations include cross sections for inelastic scattering of pions, rhos, kaons and vector kaons. Cross sections for quark-interchange-induced reactions, that were obtained in a potential model, are parametrized for convenient use. The number densities of pion and rho (kaon and vector kaon) are altered by quark-interchange processes in equal magnitudes but opposite signs. The master rate equations combined with the hydrodynamic equations for longitudinal and transverse expansion are solved with many sets of initial meson fugacities. Quark-interchange processes are shown to be important in the contribution of the inelastic meson-meson scattering to evolution of mesonic matter.

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