

# Pion production in proton induced spallation reactions in the energy range of few GeV order

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Study of proton induced reactions on various nuclei in the energy range of few GeV order is crucial for understanding of nuclear reaction mechanism. Knowledge of physical phenomena is expressed as modelling. Several models employing different simplifications have been constructed in order to verify different reaction scenarios. They assume two steps schema of the reaction mechanism involves projectile energy deposition inside target nuclei, placing it into excited state (first step) and subsequent deexcitation of the residual nuclei by evaporation of particles (second step).

Pions are the most abundantly produced mesons during proton induced reactions on atomic nuclei. Calculations of the first step of the reaction are sufficient in order to receive realistic pion spectra, since all pions are produced only in violent nucleon - nucleon collisions, where the locally available amount of four-momentum is large enough. Proper treatment of pion production and absorption may be crucial for realistic estimation of excitation energy and other properties of residual nuclei after the fast cascade of nucleon - nucleon collisions. The propriety of description of pions dynamics and production due to proton - nucleus reaction could not be really verified, because experimental data are rather scarce, especially in projectile energy range of a few GeV order.

Transport model based on Boltzmann - Uehling - Uhlenbeck (BUU) equation will be described. Results of the BUU model calculations concerning pion and nucleon production will be presented. Comparison of the results with experimental data will be discussed.

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