

Proton-Induced α -Particle Emission into the Continuum of Outgoing Energies

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The pre-equilibrium proton induced emission of light complex nuclei with energies in the continuum has been studied comprehensively for many years. Double-differential cross sections and especially analyzing power distributions are typical of an intranuclear nucleon-nucleon multistep statistical reaction mechanism. The final stage of the reaction may be a result of a direct pickup or knockout of the ejectile. The discussion on this subject continues to be a hot topic for theoretical and experimental investigations.

In this talk a brief review of the pre-equilibrium ($\vec{p}, {}^3\text{He}$) reactions will be presented. Then results from the latest studies of the inclusive (\vec{p}, α) reaction to the continuum will be reported. A formalism based on the statistical multistep direct emission formulation of Feshbach, Kerman and Koonin is found to give a reasonably good reproduction of cross section and analyzing power distributions at various emission energies. The contribution of the pickup and knockout reaction mechanism for various proton energies is discussed in details.

References

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- [2] H. Feshbach, A. Kerman and S. Koonin, *Ann. Phys. (N. Y.)* **125**, 429 (1980).