Measurement of the GT strength distribution in \(^{46}\text{Sc}\) via the \((t, ^3\text{He}+\gamma)\) reactions on \(^{46}\text{Ti}\)

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12th March (Wed) 2014, 13:30PM-

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Abstract:
Stellar electron capture (EC) reactions of pf-shell nuclei play an important role in pre-supernova stellar evolution and crustal heating of neutron stars. Astrophysical models show clear sensitivity to the details of the Gamow-Teller (GT) strength distributions, which have been extensively studied by means of charge-exchange reactions.

In the present work, we measured the GT strength distributions in one of the lightest pf-shell nuclei; \(^{46}\text{Sc}\) via the \((t, ^3\text{He}+\gamma)\) reaction on a stable \(^{46}\text{Ti}\) stationary target at \(E_t = 115\) MeV/nucleon using the GRETINA gamma-ray tracking array and the S800 spectrometer at the NSCL. Coincidence measurement with de-excitation gamma rays from the residual nuclei allowed us to study the detailed structure of low-lying GT strength, which is of particular importance for astrophysical applications. In this seminar, I would like to present some results from the experiment and compare them to theoretical calculations.

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