Contribution ID: **82** Type: **Oral contribution**

Direct Measurement of Resonances in ⁷Be(α,γ)¹¹C With DRAGON

Tuesday, 5 June 2018 16:54 (18 minutes)

Nucleosynthesis of the p-nuclei is one of the remaining unsolved puzzles in nuclear astrophysics. One possible mechanism for production of p-nuclei is the νp-process, which is thought to occur in the ejecta of core-collapse supernovae. A recent study found that the p-p chain breakout reaction ⁷Be(alpha;,gamma;)¹¹C significantly influences nuclear flow in the νp-process. However, the ⁷Be(alpha;,gamma;)¹¹C reaction rate is poorly known over the temperature range of interest (T=1.5–3 GK). In this temperature range, the astrophysical reaction rate is dominated by resonant capture to states in ¹¹C within the Gamow window, three of which have unknown resonance strengths. A new direct measurement of ⁷Be(alpha;,gamma;)¹¹C was performed at TRIUMF's DRAGON recoil separator in order to measure the strengths and energies of these resonances. Experimental methods and preliminary results will be discussed.

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Session Classification: Session 8