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Using the DRAGON to understand pollution in globular clusters

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Globular clusters contain some of the oldest stars in the universe and provide a key method of understanding the formation and evolution of galaxies. Unfortunately, there are a number of mysteries about the history of globular clusters. One of the most important is the existence of multiple populations, and evidence that the current generation of stars within globular clusters has been elementally polluted by the ashes of some unknown previous stellar event or events.

At present, the uncertainties in the stellar nuclear reaction rates are too high for astrophysical models to identify the polluting site or sites. Sensitivity studies have identified a number of important reaction rates, including $^{39}\text{K}(p,\gamma)^{40}\text{Ca}$, along with the most important resonances which must be measured. Once these reaction rates have been determined, the polluting site can be identified.

In this talk we will present results from direct measurements of important resonance strengths in $^{39}\text{K}(p,\gamma)^{40}\text{Ca}$ performed with the DRAGON recoil separator at TRIUMF in Vancouver, Canada including the first direct measurement of the resonance predicted to dominate the reaction rate in the expected range of astrophysical temperatures.

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