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First measurement of a weak r-process reaction on a radioactive nucleus.

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In this talk, I will present results on the first (α, n) cross-section measurements on beams of ^{86}Kr and ^{94}Sr . Both reactions are influential for the weak r-process in neutrino-driven winds of type-II supernovae and neutron star mergers. The measurement of $^{94}\text{Sr}(\alpha, n)$ constitutes the first weak r-process reaction measured with a radioactive beam. This work was enabled by novel nanostructured Si:He targets, demonstrating their suitability for measurements of astrophysical reactions for the first time. Reactions were identified by recoil- γ coincidences using the EMMA mass spectrometer combined with the TIGRESS HPGe array at TRIUMF. The obtained cross-sections are compared with predictions from Hauser-Feshbach theory, from which we also compute a new recommended reaction rate at temperatures characteristic of the weak r-process.

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