

## **$^{80}\text{Ge}(\text{d},\text{p}\gamma)$ measurements at FRIB to inform $(\text{n},\gamma)$ reaction rates in weak r-process nucleosynthesis**

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Individual  $(\text{n},\gamma)$  rates become important in the weak r-process near  $Z=26-34$  and  $N=50$  during freeze out from a hot process. The  $(\text{n},\gamma)$  rates for a handful of specific isotopes exhibit notable impacts on final r-process abundance patterns in sensitivity studies [1]. One such nucleus with enhanced sensitivity is  $^{80}\text{Ge}$  and is in reach for reaction studies at FRIB. The  $^{80}\text{Ge}(\text{d},\text{p}\gamma)$  reaction will be measured at FRIB in April 2024 using GODDESS (GRETINA ORRUBA: Dual Detectors for Experimental Structure Studies) [2] and the S800 at  $\sim 45$  MeV/u. This measurement aims to constrain spectroscopic factors for bound states including low-lying  $\frac{1}{2}^{+}-\frac{5}{2}^{+}$  doublet. This will be done in combination with a previous measurement at  $\sim 4$  MeV/u [3], from which direct neutron capture cross sections will be determined. Additionally, the experiment will inform the compound nucleus  $(\text{n},\gamma)$  cross sections via the Surrogate Reaction Method [4]. Experimental set up and preliminary data from the experiment will be discussed.

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