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Understanding ^{22}Na cosmic abundance

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We have developed a new, extremely precise experimental approach for measuring the lifetimes of excited states. This method uses gamma-tracking detectors with high resolution in energy and angle.

This method has been used at GANIL, France, to measure the lifetimes of ^{23}Mg excited states. The gamma rays were measured with the AGATA gamma-ray detector, and the ejectiles from the $^3\text{He}(^{24}\text{Mg}, \alpha)^{23}\text{Mg}^*$ reaction were measured in coincidence with the VAMOS++ spectrometer. This measurement was used to constrain the rate of the $^{22}\text{Na}(p, \gamma)^{23}\text{Mg}$ reaction, and to determine the maximum detection distance of the ^{22}Na produced in novae.

Ref: Fougères, Chloé, et al. "Search for ^{22}Na in novae supported by a novel method for measuring femtosecond nuclear lifetimes." *Nature communications* 14.1 (2023): 4536.

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