

## Nuclei in the Cosmos (NIC XVII)



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# Isotopic ratios from (sub)millimetre observations of AGB stars

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Asymptotic giant branch (AGB) stars are a late evolutionary phase of low- and intermediate-mass star. They are typified by rapid mass loss through a stellar wind rich in molecular diversity, which is also a key site of dust formation in the universe. Their stellar winds provide a unique opportunity to study the isotopic ratios of various key atomic species that form molecules and whose isotopologues can be easily distinguished in their millimetre and submillimetre spectra. This means that spectrally resolved observations of various isotopologues can tell us about either the properties of the AGB star being studied or the conditions of its natal environment. For example, we can use oxygen isotopic ratios to determine the initial masses of low-mass AGB stars, magnesium isotopic ratios to determine the isotopic ratios of intermediate-mass AGB stars and the isotopic ratios of silicon and sulphur to gauge the initial metallicities of AGB stars. With these direct observations, we can constrain the origins of silicon carbide and silicate pre-solar grains. I will discuss my recent results calculating AGB isotopic ratios based on sensitive ALMA observations and future prospects of for this field.

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