

Dust production by metal-poor stars

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The proper treatment of dust production by metal-poor AGB stars of different masses is vital for understanding dust physics: from mass loss of AGB stars to their role in galactic ecology; from the thermodynamic properties of the ISM to integrated galaxy spectra; from the chemical enrichment of the Universe to the composition of the ISM and new stars and planets. Yet most models do not allow for any variation of stellar dust production beyond the simple (but poorly-constrained) dichotomy of carbon from carbon-rich stars and silicates from oxygen-rich stars, and the decrease in the amount of dust produced by metal-poor stars. This is largely because dust production by metal-poor stars has only recently begun to be observed on a meaningful scale.

In this presentation, I will discuss our current understanding of how AGB dust production varies with stellar mass and metallicity, particularly in the context of low-mass and metal-poor stars. I will discuss differences in dust composition of oxygen- and carbon-rich stars. I will examine how the onset of dust production varies with metallicity, how it is linked with pulsation, and discuss how the winds of oxygen-rich, metal-poor stars might be driven. Finally, I will discuss the role of metal-poor stars in galactic ecology and their contribution to the ISM of their host galaxies.

This presentation will bring together time-series and spectroscopic observations from VISTA, the VLT and other telescopes: notably I will report on our ALMA observations. I will fold in data from new and existing surveys (including VHS, VVV, *Kepler* and *WISE*) and look toward a future inspired by *Gaia* and *JWST*, which have the potential provide a largely-complete understanding of the variations of dust production over all masses and metallicities.