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The metallicity-dependence of mass loss in carbon stars

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AGB stars are major contributors of dust in the universe, feeding newly produced elements into the surrounding interstellar medium in the form of gas and dust through their stellar winds.

The detailed modelling of these dense winds or outflows is therefore crucial for understanding both the chemical evolution of galaxies, and the dust production in the interstellar medium. The mass loss observed in AGB stars is believed to be caused by a combination of atmospheric levitation by pulsation-induced shock waves, creating favourable conditions for dust formation, and radiative acceleration of these newly formed dust grains. This mass-loss scenario has been successfully implemented in the 1D radiation-hydrodynamic code DARWIN for AGB stars at solar metallicity.

But what about the dust production from AGB stars in low metallicity environments such as found in the LMC or SMC? In this talk I will present wind properties, such as mass-loss rates, wind velocities and dust-to-gas ratios, from a set of DARWIN models at metallicities compatible with the LMC and SMC. These results show that as long as stars dredge up sufficient amounts of carbon during the AGB phase, they will contribute significantly to the dust production, also at LMC and SMC metallicities.

Consider for a poster?

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