How carbon stars die: The link between pulsations and dust production

G.C. Sloan (STScI, UNC Chapel Hill), K.E. Kraemer (Boston College)

The photometric view

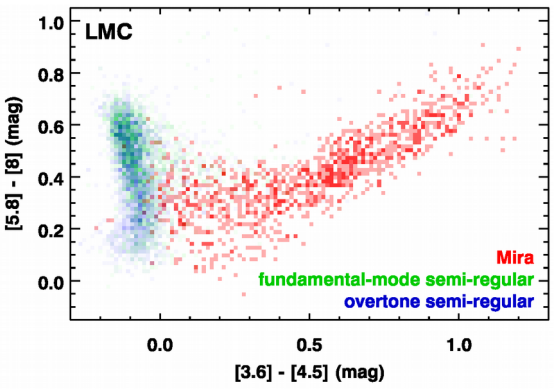
Focus here on carbon stars in the LMC.

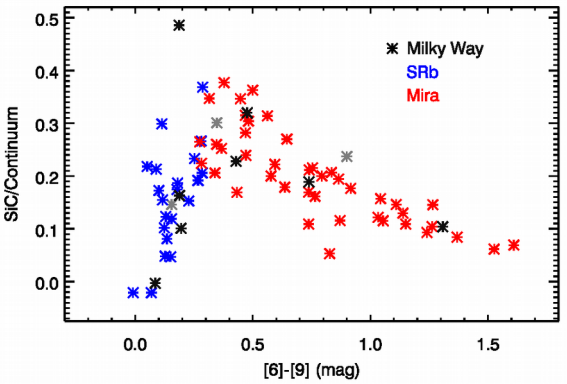
Miras dominate the dusty population ([3.6]–[4.5] > 0).

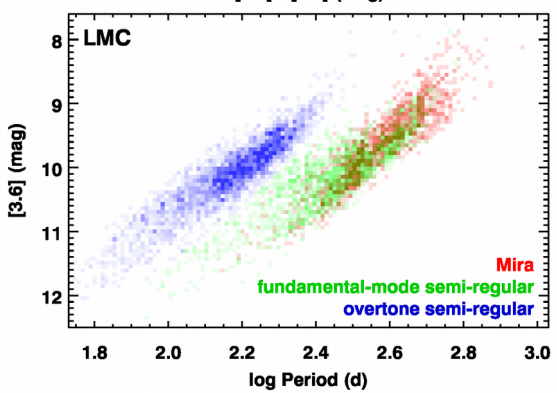
Miras and **semi-regular variables (SRVs)** are defined by OGLE-III.

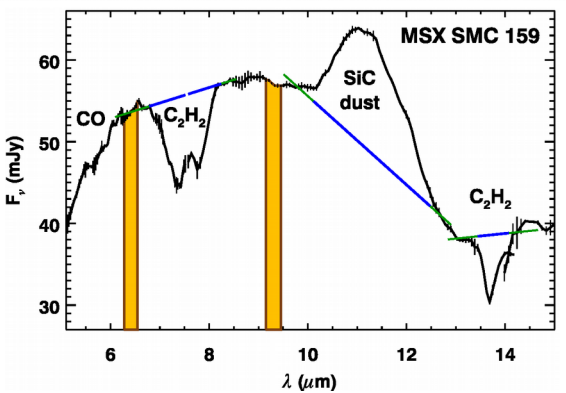
SRVs can pulsate in the **fundamental mode** or an **overtone**, but either way, they aren't forming a lot of dust.

(Carbon stars behave the same in the SMC.)









Figures from Kraemer et al. (2019) and Sloan et al. (2016).

The spectroscopic view

Spectra of Galactic carbon stars from *SOFIA* and *ISO* reveal the dust dichotomy between **Miras** and **semi-regulars**.

SiC dominates what little dust **semi-regulars** make. In **Miras**, the production of amorphous carbon has kicked in and will swamp the SiC.

Bottom: The [6]–[9] color measures the total dust content in the spectra (in **yellow**). Amorphous carbon has no features; it just reddens the spectrum.