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Constraining dust mineralogy from mid-IR spectra

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The first ISO spectra of evolved stars revealed a wealth of features in AGB stars, YSOs, comets and other environments, which have been linked to a variety of crystalline silicate and oxide species. The presence and strength of these features carries information about the formation and processing history of the dust in AGB envelopes. However, unlocking this information has proven difficult; our understanding is anecdotal at best, being based on small, likely biased, samples. While ISO and Spitzer have observed the mid-IR spectra of hundreds of sources, these datasets have not been properly exploited yet. Statistical problems have been a significant factor, primarily the difficulty in simultaneously fitting the overall SED and the details of spectral features using radiative-transfer models. I will explore these and related problems before presenting an attempt to alleviate them. I will present a new code we are developing, AMPERE, which includes the correct statistical treatment for simultaneous fitting of different kinds of data (photometry, spectra, imaging, interferometry). I will conclude with first results of an experiment in self-consistently fitting SEDs and mid-IR spectra to obtain detailed constraints on dust properties, including mineralogy, in selected oxygen-rich AGB envelopes.

Consider for a poster?

Yes

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Session Classification: Observational constraints on dust properties

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