Prebiotic Molecules in the Circumstellar Environment

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Recent millimeter-wave and infrared spectroscopic observations have identified a large number of complex organic compounds through their rotational and vibrational transitions. In particular, the detections of the stretching and bending modes of aliphatic and aromatic compounds have revealed a continuous synthesis of organic material from the end of the asymptotic giant branch (AGB) to proto-planetary nebulae, to planetary nebulae. High resolution imaging observations in the submillimeter (e.g., SMA) and in the mid-infrared (e.g., Gemini) have made possible the mapping of the distribution of these compounds, making it possible for us to infer the history of circumstellar chemistry.

In this talk, we will summarize some of the recent spectroscopic and imaging observations of the circumstellar envelopes of evolved stars and present a scenario of chemical evolution including the possible role of photochemistry in the late stages of stellar evolution.