IRAS 17516-2525: THE BIRTH OF A PLANETARY NEBULA?

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ABSTRACT. IRAS 17516-2525 is a cool object at infrared wavelengths between 1 and 60μm. Spectroscopy in the wavelength ranges 2 - 2.5μm and 3 - 3.5μm shows the presence of Br_α, Br_γ, Pf_γ emission lines and of a weak C_2H_2 absorption band, all clearly associated with the IRAS source. At the infrared position a faint star with a visual magnitude of about 20 is found.

A double peaked 1612 MHz OH maser profile, which is characteristic for OH/IR stars situated at the top of the AGB, coincides with the source -the accuracy of the OH measurement is modestly good. Assuming that the OH source is indeed associated with the IRAS object, one concludes that the expanding distant dust shell must have been formed on the AGB, when the star was much cooler (typical 2500 K) and the mass loss rate much larger. The shell has an expansion velocity of 17 km/s. From the line profile of Br_α we find an expansion velocity of the hot inner region of about 50 km/s.

The ionizing region has to be small ($R < 10^{15}$ cm) because a VLA measurement of the radio continuum flux (P. Katgert, private communication) gave an upper limit of 5mJy. The fact that the redshifted OH maser peak is still visible supports the smallness of the ionized region.

A simple model (Van der Veen *et al.*, this conference) fitted to the observed energy distribution is consistent with a hot star ($T_* > 30000$ K) surrounded by a hot nearby dust shell (900 K) and a cold distant dust shell (100 K). The nearby dust shell contains about 10^{-4} $M_\odot$ and must have been ejected recently (5-20 yr). This result is practically independent of the assumed luminosity of the central star. If we assume a typical core mass of the central star equal to 0.58 $M_\odot$ ($L_* = 6000$ $L_\odot$), the mass of the distant dust shell is of the order of one solar mass and was ejected about 2000-3000 years ago.

Finally: the observed C_2H_2 absorption at 3μm in combination with the OH maser emission suggest that the star is now being transformed from an oxygen-rich AGB star into a carbon-rich proto-planetary nebula.

S. Torres-Peimbert (ed.), Planetary Nebulae, 446.