UKIRT CGS3 OBSERVATIONS OF NEW IRAS 21 MICRON SOURCES

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An unidentified emission feature at 21 μm has been detected in the IRAS Low Resolution Spectra (LRS) of 5 IRAS sources (Kwok, Volk, and Hrivnak 1989, Hrivnak and Kwok 1991). The sources are generally found to be F and G supergiants with cool, detached dust shells. We have searched for additional 21 μm sources in the LRS database and have obtained ground-based UKIRT spectra at 10 and 20 μm in an attempt to confirm the LRS feature.

The LRS spectra of 05113+1347, 20000+3239, and 22223+4327 show a peak around 21 μm, a flat plateau between 12 and 18 μm, and a drop between 7 and 11 μm which are the characteristics of 21 μm sources such as 07134+1005. UKIRT CGS3 spectra of these 3 sources plus 05341+0852 have been obtained with spectral resolution of CGS3 is ~52 at 10 μm and ~72 at 20 μm. The spectra of the 05341+0852 is different from the others in that the 10 μm band is higher than the 20 μm band. We are therefore less certain about the 21 μm feature in this object.

Ground-based visible, near- and mid-infrared photometry have been obtained for the 21 μm sources. The energy distribution of the sources show the "double-peaked" distribution characteristic of proto-planetary nebulae (see Kwok, this volume).

All the 21 μm sources have been found to show carbon-rich photosphere with C_2 and/or C_3 features (see Hrivnak IV:120). Unidentified 3.4-3.5 μm features are also observed in addition to the 3.3 μm PAH feature (Geballe et al. 1992). The strength of the 21 μm feature implies that it originates from an abundant element. The carbon-rich nature of the sources suggests that the carbon atom may be a major constituent of the molecule/grain responsible for the 21 μm feature.

References

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