OH MASER EMISSION FROM YOUNG PLANETARY NEBULAE

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ABSTRACT. OH/IR stars are now generally accepted to be progenitors of planetary nebulae. We have carried out a project to try to find objects in the transition phase between OH/IR stars and PN. Transition objects should be characterized by having both continuum radio emission and a 1612 MHz OH maser line. The continuuum emission would indicate that the central star has become hot enough to ionize part of the envelope, while the OH maser indicates that a large part of the envelope is still neutral. Only one such object was known, namely Vy 2-2.

We have observed 70 OH/IR stars with the VLA at 2 cm. The stars were selected on the basis of low IRAS colour temperatures and a single 1612 MHz maser peak. During the transition phase the dust shell is expected to be detached from the central star, lowering the dust temperature. In the case of an ionized inner shell the red shifted peak should be unobservable due to absorption.

Three stars were found to have continuum emission at 2 cm. For those stars we obtained 6 cm measurements and measured the precise position of the OH maser. For two of the three objects, the association of the maser line with the continuum source was confirmed. In the case of the third source the line was not detected at the previously reported level.

As part of another project a number of PN were found to have a very high infrared excess, ranging from 10 to more than 100. As these sources might also be very young PN, we searched for OH maser emission using the Parkes radio telescope. Out of eleven objects seven were detected. The precise position of the OH masers still needs to be measured, but the high detection rate indicates that they probably are associated with the PN.

One of the OH/IR stars which we detected with the VLA is possibly unique, having a 2 cm continuum flux density of 7.2Jy. At 2 cm the source is still optically thick. This object would have the highest flux density of any known PN.

The results of the project are twofold. First of all, we now have a sample of PN which are known to be very young and which are known to originate from OH/IR stars. Secondly, OH emission from young PN appears to be much more common than previously thought.

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