PLANETARY NEBULAE: THEIR EVOLUTION AND ROLE IN THE UNIVERSE
IAU Symposium, Vol. 209, 2003
S. Kwok, M. Dopita, and R. Sutherland, eds.

Nature of the H_2 Emission Around Planetary Nebulae Precursors

D.A. García-Hernández

IAC, C/ Vía Lactea s/n, E-38205, La Laguna, Tenerife, Spain

A. Manchado

IAC, C/ Vía Lactea s/n, E-38205, La Laguna, Tenerife, Spain, and Consejo Superior de Investigaciones Científicas, CSIC

P. García-Lario

ISO Data Centre, Astrophysics Division, Space Science Department of ESA, VILSPA, E-28080, Madrid, Spain

C. Domínguez-Tagle

IAC, C/ Vía Lactea s/n, E-38205, La Laguna, Tenerife, Spain

G.M. Conway

Department of Physics and Astronomy. University of Calgary, Alberta T2N 1N4, Canada

F. Prada

CAHA, Apartado de Correos 511, E-04080, Almería, Spain

We present near-IR spectroscopy of a sample of 30 IRAS sources recently identified as late AGB stars, post-AGB stars or early PNe. The spectra obtained are centred at various wavelengths covering the molecular hydrogen v=1→0 S(1) 2.122 μm and v=2→1 S(1) 2.248 μm emission lines, the recombination lines of hydrogen Brγ 2.166 μm, Pfγ 3.741 μm and Brα 4.052 μm, and the CO[v=2→0] first overtone bandhead at 2.294 μm. As a result of these observations we have increased from 4 to 13 the total number of proto-PNe detected in H_2 and we have confirmed that the onset of H_2 emission takes place in the post-AGB phase. When the molecular hydrogen is fluorescence-excited the detection rate is found to be directly correlated with the evolutionary stage of the central star, rather than with the nebular morphology. In contrast, shocked-excited H_2 is detected only in strongly bipolar proto-PNe, sometimes even at an early stage in the post-AGB phase. The strong correlation of shocked-excited H_2 emission with bipolarity found confirms the result previously reported by Kastner et al. (1996) in evolved PNe. However, our results show that this correlation does not exist in the case of fluorescence-excited molecular hydrogen. (to be published in A&A).