

EINSTEIN X-RAY OBSERVATIONS OF PLANETARY NEBULAE AND THEIR IMPLICATIONS

S.P. Tarafdar and K.M. V. Apparao
 Tata Institute of Fundamental Research
 Homi Bhabha Road, Bombay 400 005, India

ABSTRACT. Central stars of nineteen planetary nebulae were observed for X-ray emission using the Einstein Observatory and four of them were detected. High resolution observations with the Einstein Observatory indicates that the X-ray source in NGC 246 is a point source. These planetary nebulae with positive observations turn out to be the nearest, have the least extinction and also have the largest size of the nebulae around them. It is possible that X-ray emission is observed from these planetary nebulae with larger ages because of the smaller extinction by the nebulae and also due to the settling of heavy elements in the central star which otherwise prevents escape of X-rays by providing opacity.

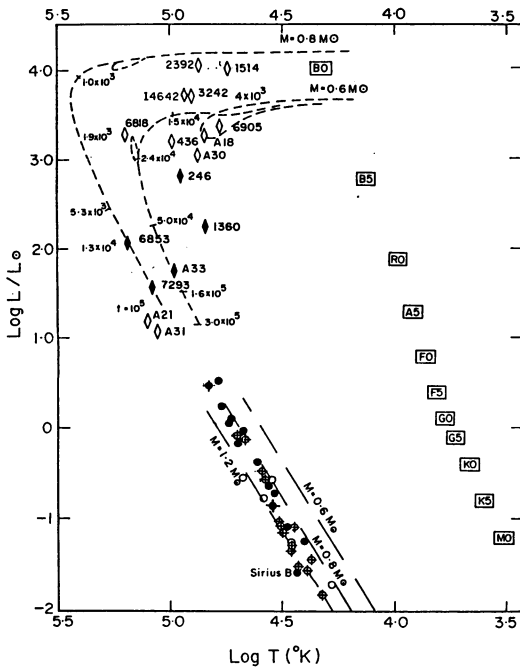


Fig. 1. Positions of planetary nebulae with X-ray observations (diamond symbols) are shown in the HR-diagram. Filled symbols for positive observations and open symbols for upper limits. Positions of main sequence stars are marked with squares. White dwarfs with X-ray observations are marked with circles; crosses superimposed on circles indicate white dwarfs other than DA type. Dashed curves are evolutionary tracks of 0.6 M_{\odot} and 0.8 M_{\odot} degenerate carbon-oxygen core with hydrogen and helium shell burning. Ages are on each track. Curves through the positions of white dwarfs are cooling tracks of white dwarfs as given by Paczynski (1971).

tracks of 0.6 M_{\odot} , 0.8 M_{\odot} and 1.2 M_{\odot} stars given by Paczynski (1971).
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S. Torres-Peimbert (ed.), *Planetary Nebulae*, 304.
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