

IS THERE A CONNECTION BETWEEN THERMAL PULSES AND PNE HALOS: AN APPROACH TO AN ANSWER

ADAM FRANK and BRUCE BALICK

Astronomy Department, FM-20, University of Washington, Seattle WA 98195, USA

and

WILL VAN DER VEEN

Astronomy Department, Columbia University, N.Y., N.Y. 10027, USA

ABSTRACT. We wish to explore the hypothesis that the shells and halos of planetary nebulae are formed during the thermal pulsing of progenitor AGB stars. Using published data and model results we compare the AGB interpulse time Δt_T and the time between shell ejections Δt_D for a sample of PNe with halos. Δt_T is derived from the Paczynski relation using the PNe central star luminosity. Δt_D is calculated using the radii and velocity of PNe shells and halos.

Conclusions. 1. 5 out of 6 of the PNe in fig 1 have Δt_D and Δt_T that are within an order of magnitude of each other. 2. The analysis is extremely sensitive to the assumed distances as the two points for NGC 7662 demonstrate. 3. One must be careful not to consider PNe central stars that are already on cooling tracks. The Δt_T - L_* relation does not hold for these cases. This seems to apply to NGC 6720. 4. All the points lie close to or *above* the $\Delta t_D = \Delta t_T$ line but never below it.

After removing NGC 6720 out of the plot and considering the different luminosities and distances quoted for NGC 7662, there is only one point more than 1σ from the line $\Delta t_D = \Delta t_T$.

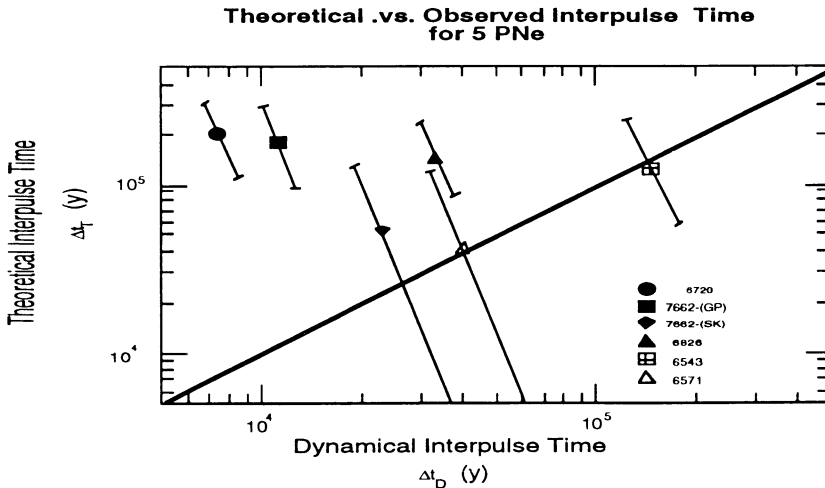


Fig 1. Data points are labeled with their NGC numbers. We used data from two authors for NCG 7662.