PHYSICAL PROPERTIES OF THE CENTRAL STARS OF PLANETARY NEBULAE IN THE MAGELLANIC CLOUDS

T.P. Stecher, S.P. Maran, T.R. Gull
Laboratory for Astronomy and Solar Physics, NASA-Goddard Space Flight Center, Greenbelt, Maryland 20771, USA

L.H. Aller
Department of Astronomy, University of California, Los Angeles, USA

M.P. Savedoff
Department of Physics and Astronomy, University of Rochester, New York, USA

Absolute flux distributions in the ultraviolet continua of the central stars of three planetary nebulae of known distances have been derived from observations made with the International Ultraviolet Explorer. The observations confirm the existence of planetary nebulae nuclei with masses of $\approx 1 M_\odot$ and indicate that the progenitors of the nebulae were carbon stars near the theoretical upper luminosity threshold of $M_{bol} = -6.5$. The derived masses, luminosities, and temperatures of the three stars indicate that they are currently on horizontal tracks in the HR diagram and probably have not yet attained their maximum luminosities. The present luminosities ($\approx 4 \times 10^4 L_\odot$) each are well above the Eddington luminosity for an 0.6 $M_\odot$ star. The derived properties of the stars and associated nebulae (LMC P40, SMC N2, SMC N5) are consistent with a nebular ejection mechanism that involves radiation pressure on carbon grains.

EDITOR'S NOTE: Dr. Stecher preceded his scheduled paper by a brief presentation of the detection of an emission line object, possibly a PN, in the globular cluster M5. The N IV] λ 1487 transition had been observed with the IUE satellite. The discussion below refers to the scheduled paper.

PEIMBERT: Are SMC N2 and SMC N5 carbon-rich?

STECHER: Their carbon abundance is similar to that of Galactic PN, but the oxygen abundance is low so they are "carbon-rich". The enrichment relative to the interstellar abundance is a factor of 40, showing that carbon has been made in the stars and convected to the surface.

MATHIS: Interstellar extinction is important in the IUE wavelength range. Did you use a "Galactic" or "LMC" extinction law?

STECHER: We have used the results of work by four different groups to obtain the extinction curve. The shortest wavelength point of the continuum would change by 30% if a "Galactic" curve were used.

https://doi.org/10.1017/S0074180900093918 Published online by Cambridge University Press