

**CALIBRATION OF PERIOD-LUMINOSITY RELATION OF HIGH AMPLITUDE
 δ SCUTI TYPE VARIABLES USING BAADE-WESSELINK METHOD**

B. Sajeevan^{*} and T.P. Ranawaka

Department of Physics, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka
**sajeevanb@sci.pdn.ac.lk*

High amplitude δ Scuti (HADS) variables are a promising set of candidates to be utilized as a cosmic distance indicator which is one of the fundamental tools in many fields of modern astrophysics. The Baade Wesselink method provides precise techniques to establish the distances to standard candles like High amplitude δ Scuti variables by the determination of their stellar radii. Photometric data was obtained for SZ Lyn and BS Aqr using the GOTO 45 cm Cassegrain telescope from the Arthur C. Clarke Institute of Modern Technologies. The data was reduced and analyzed using IRAF image reduction application. The radial velocities for both SZ Lyn and BS Aqr were obtained from the Vizier portal provided by (Strasbourg Astronomical Data Center CDS). The application of the Baade Wesselink method to both HADS variables resulted in placing SZ Lyn at a distance of 430.725 ± 14.876 pc and BS Aqr at a distance of 361.077 ± 6.301 pc with mean absolute magnitudes of 1.91 ± 0.45 and 1.57 ± 0.38 for SZ Lyn and BS Aqr, respectively. The Period-Luminosity (PL) relation was found out to be $\langle M_V \rangle = -(1.561 \pm 0.341) \log_{10} P + 0.475$, which was then used to determine the distances to nearby galaxies. Pulsation periods and V band magnitudes of High Amplitude δ Scuti variables of the Large Magellanic Cloud and Carina spheroidal galaxy were obtained from Optical Gravitational Lensing Experiment (OGLE) and General Catalog of Variable Stars (GCVS) catalogues through the vizier portal. Upon the implementation of the PL relation, it was determined that the distance to the Large Magellanic Cloud is 51.56 ± 2.00 kpc and Carina is at a distance of 111.93 ± 4.33 kpc. Through the comparison of these distances with other works in the same area it was concluded that the Baade Wesselink method for high amplitude δ Scuti variables is a viable option for cosmic distance measurements.

Keywords: Carina galaxy, Cosmic distance indicator, IRAF, Large Magellanic Cloud, δ Scuti variables