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Orbital elements of SZ Lyn

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SZ Lyncis, HD 67390 (RA=08^h 09^m 35.8^s, DEC=+44° 28' 17.6") is a high amplitude Delta Scuti type binary star of magnitude m_v= 9.1, which has pulsation period of 0.12053491 days. The photometric observations of V band were carried out in six nights at Mount Abu Infrared observatory, India. The times of light maxima were taken from the light curve by fitting a Fourier series. Hence the difference of the observed times of light maxima and the calculated times of light maxima is obtained and it is depicted by an O-C diagram. A total of 170 light maxima, including our observations of 9 light maxima of SZ Lyn, 33 of Wide-angle search for planets (WASP), 27 of American Association of Variable Star Observers (AAVSO) and 101 observations, were used for the O-C analysis. The O-C diagram is non-linear and it was approximated by secular change in pulsation period and the light-travel-time effect of the binary orbit. The fitting of non-linear function in the least square method determines the orbital parameters, projected semi-major axis, $a\sin(i)$, and eccentricity, e, of the orbit. The least square solution of Levenberg-Marquardt (LM) algorithm was converged to minimum χ^2 of 8.685 x 10^{-4} to determine the best fit and hence obtained the coefficients. The determined $a\sin(i)$ and the eccentricity (e) were $1.5 \pm 0.2 \times 10^8$ km and 0.44 ± 0.04 respectively. The errors of the parameters were determined by Monte Carlo simulation of synthetic data sets. The convergence of solution also approximated the pre-determined orbital period to 1186 ± 10 days.

Key words: SZ Lyn, orbital parameters, light-travel-time effect

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