

# Investigating the Star Formation History of Dwarf Irregular Galaxy, NGC 6822, Through Evolved Stellar Population

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## Sample and Methodology

NGC 6822 is an isolated dwarf irregular galaxy in the local group at a distance of 490kpc. Its star formation history (SFH) has been studied through evolved asymptotic giant branch (AGB) stars with a period of longer than 100 days, known as long-period variables (LPV). As LPVs pulsate, they reach their maximum luminosity. LPVs maximum luminosity can be related to their birth mass, enabling us to estimate the star formation rate (SFR) in NGC 6822.

## Data

The SFH has been studied in two regions: the bar region (red rectangle), and the outer region, which covers an area beyond the bar region, extending to the radial distance of 3 kpc. The dataset consists of 329 LPVs stars, situated across the galaxy.

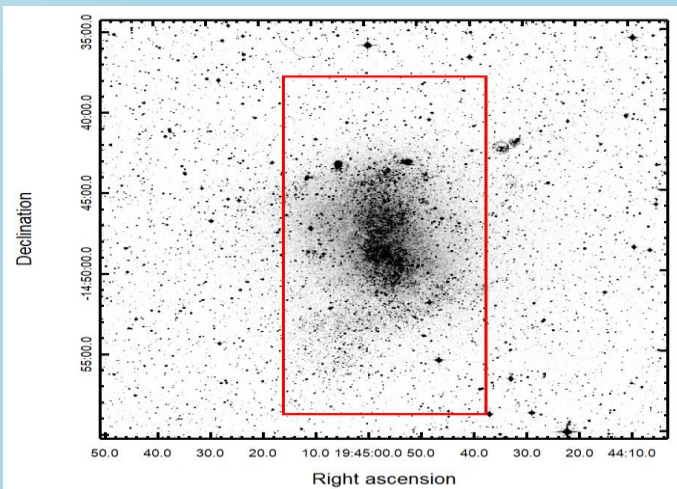


Figure 1: The optical image of NGC 6822, taken by UK-Schmidt Telescope (Digitized Sky Survey, 1994DSS...1...0000).

## Results and Conclusion

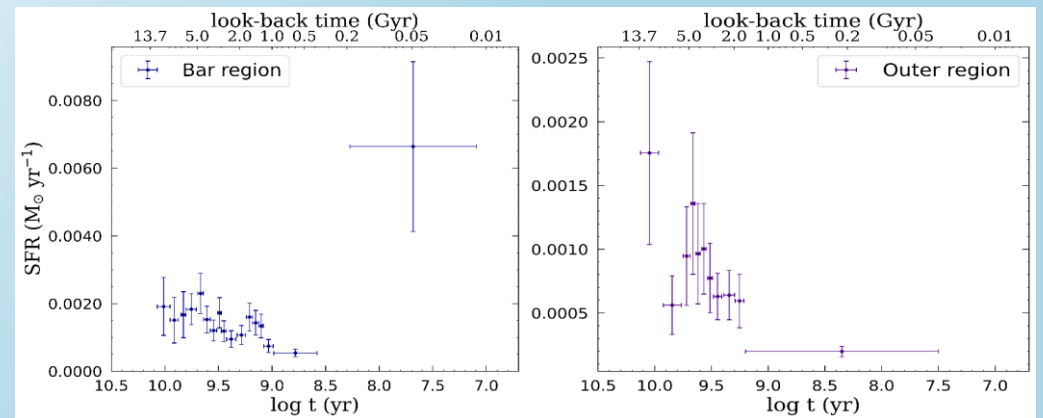


Figure 2: The SFH for the bar region and the outer region.

The SFH is obtained, assuming an age-metallicity relation to account for variation in the galaxy's chemical content. It is found that the onset of star formation in NGC 6822 traces back to  $\sim 12.5$  and  $\sim 13$  Gyr ago in the bar and outer regions, respectively. There are 3 main epochs of star formation in the bar region, which reach their peak at  $\log(t) \sim 9.66$  (4.6 Gyr),  $\log(t) \sim 9.21$  (1.6 Gyr), and  $\log(t) \sim 7.68$  (50 Myr), where  $t$  is the look-back time. The recent SFR in the bar region is estimate to be  $0.007 M_{\odot}$ . The outer region undergoes 1 main epoch at  $\log(t) \sim 9.66$  (4.6 Gyr) and remains undisturbed afterwards. The peak around  $\log(t) \sim 9.66$  is consistent with the previous research suggesting that NGC 6822 passed through the virial radius of the Milky Way,  $\sim 200$  kpc, around 3-4 Gyr ago.