

# LOOKING FOR OBSERVATIONAL EVIDENCE OF STAR FORMATION STOCHASTICITY IN THE CALIFA DATASET

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En este trabajo estudiamos datos espectrales publicados por el grupo del sondeo CALIFA. Encontramos que al analizar regiones de baja formación estelar (SFR) se observan fluctuaciones de la razón  $H_\alpha/H_\beta$  que no son completamente explicadas por efectos de polvo interestelar. Proponemos que esta fluctuación detectada es debida a la influencia de procesos estocásticos, los cuales han sido cuantificados en simulaciones anteriores.

In this work, we study spectral data published by the CALIFA survey. When analyzing regions of low star formation rate (SFR) we find fluctuations of the  $H_\alpha/H_\beta$  which are not fully explained by interstellar dust effects. We propose that the detected fluctuation is due to the influence of stochastic effects, which have been quantified in previous simulations.

Using the CALIFA data published by PIPE3D (Sánchez et al. 2016), we study the ratio between the  $H_\alpha$  and  $H_\beta$  emission line intensities. According to simulations, regions of low SFR are susceptible to stochastic effects due to irregular bursts of star formation as well as finite sampling in mass and time.

The combination of these factors is believed to cause fluctuation of emission line intensities (Forero-Romero & Dijkstra 2013). With the CALIFA data, we make a histogram of the  $H_\alpha/H_\beta$  value distribution, discriminating data according to high SFR ( $> 1.89 \times 10^{-1} M_\odot \text{yr}^{-1}$ ), low SFR ( $< 2.99 \times 10^{-2} M_\odot \text{yr}^{-1}$ ) and a region in between. This provides a visualization of emission line fluctuations according to different SFR.

Forero-Romero & Dijkstra (2013) studied the fluctuations of the  $\text{Ly}_\alpha$  Equivalent Width (EW) in idealized galaxies where stochasticity effects were included. They found that as SFR goes down the EW fluctuations increase, following the same behavior as the  $H_\alpha/H_\beta$  histograms.

Despite lacking dust effect corrections, we suggest that stochasticity as a significant influence in low SFR regions. This is because dust is not as

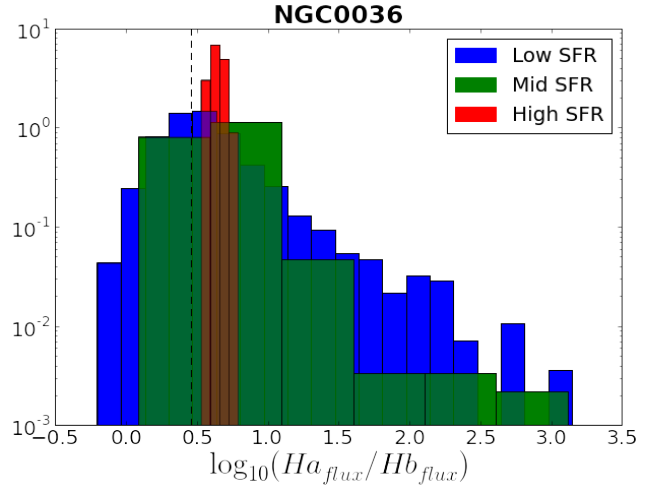


Fig. 1. Distribution of  $H_\alpha/H_\beta$  values according to high, mid or low SFR. The vertical dashed line represents the expected value from atomic physics.

abundant in low SFR regions as it is in high SFR regions. Furthermore, interstellar reddening causes fluctuation in only one direction, which is not the case for the data. In our results, data associated with low SFR values is clearly more broadly distributed than at higher SFR. A fitting procedure was performed on the observed distributions and was found to follow the behaviour described in simulations by Forero-Romero & Dijkstra (2013).

## REFERENCES

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