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PLANETARY NEBULAE AS PROBES OF THE CHEMICAL EVOLUTION OF THE GALACTIC BULGE

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In this work we report the observations of Planetary nebulae located in the Galactic bulge (GBPNe), close to the Galactic centre. We find that GBPNe near the Galactic centre can be classified in two groups: one formed in a metal poorer and other at a metal richer environment. Also, there is evidence for recent star formation episodes occurring at the Galactic centre.

Planetary nebulae are an important tool to study the chemical evolution of the Milky Way and other galaxies. Their bright emission lines make them useful objects to probe the nucleosynthesis processes and chemical enrichment of distant and obscured structures within the Milky Way, as the Galactic bulge. Planetary nebulae located in the Galactic bulge (GBPNe) are especially important, since they can shed light on the more general problem of the bulge formation and evolution. For many years our group has been building one of the largest samples of GBPNe chemical abundances available in the literature. In 2009 we started an observational program aimed at carrying out a spectroscopic follow-up of GBPNe located within 2° of the GC. The 4.1 m SOAR telescope at Cerro Pachón (Chile) equipped with the Goodman spectrograph and the Observatório Pico dos Dias (OPD) of National Laboratory for Astrophysics (LNA, Brazil) with the 1.6 m Perkin-Elmer telescope were used for this purpose. We observed a sample of 17 high-extinction PNe from the catalogue of Jacoby & Van de Steene (2004), deriving physical parameters and chemical abundances. This sample is used in this work to study the chemical enrichment of the Galactic centre. In Fig. 1 we find that GBPNe near the Galactic centre can be classified in two groups: one formed in a metal poorer and other at a metal richer environment. In the PNe located near the Galactic centre, a large fraction of PNe have abundances compatible with models at higher progenitor masses. A higher N/O ratio is expected for more massive progenitor stars and may indicate recent episodes of star formation taking place at the GC, compared with the outer regions of the Galactic bulge. More information can be found in Cavichia et al. (2017).

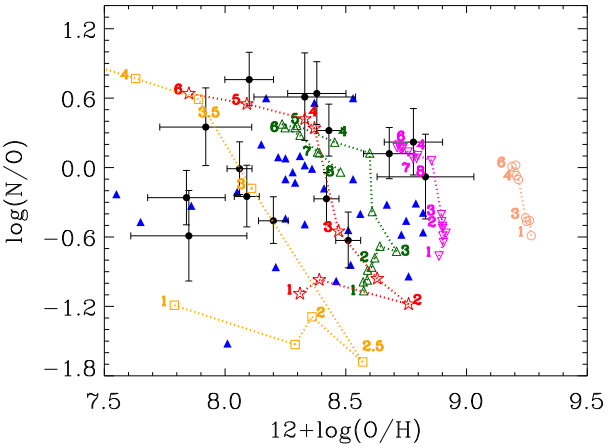

Fig. 1. Fig. 1. log(N/O) vs. 12 + log(O/H). Filled circles with error bars are data from Galactic centre PNe. Filled blue filled triangles are from Cavichia et al. (2010) (outer bulge PNe). Unfilled symbols with numbers joined by dotted lines represent the results of the AGB nucleosynthesis models and the numbers give the initial masses in $M_\odot$ units. The orange triangles are models for $Z = 0.001$ from Ventura et al. (2013) and Ventura et al. (2014a); green circles for $Z = 0.004$ from Ventura et al. (2014b), purple squares for $Z = 0.008$; red stars for $Z = 0.018$, magenta upside down triangles for $Z = 0.018$ and salmon circles for $Z = 0.04$ obtained from F. Dell'Agli and J. Garcia-Rojas (priv. com.).

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