Galaxy Evolution and Feedback across Different Environments
Proceedings IAU Symposium No. 359, 2020
T. Storchi-Bergmann, W. Forman, R. Overzier & R. Riffel, eds.
doi:10.1017/S1743921320001994

Unveiling the nuclear region of NGC 6868: Mapping the stellar population and ionized gas

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Abstract. We mapped the stellar population and emission gas properties in the nuclear region of NGC 6868 using datacubes extracted with Gemini Multi-Object Spectrograph (GMOS) in the Integral Field Unit (IFU) mode. To obtain the star-formation history of this galaxy we used the STARLIGHT code together with the new generation of MILES simple stellar population models. The stellar population dominating (95% in light fraction) the central region of NGC 6868 is old and metal rich (∼10 Gyr, 2.2 $Z_\odot$). We also derived the kinematics and emission line fluxes of ionized gas with the IFSCUBE package. A rotation disk is clearly detected in the nuclear region of the galaxy and no broad components were detected. Also, there is a region where the emission lines disappear almost completely, probably due to diffuse ionized gas component. Channel maps, diagnostic diagrams and stellar kinematics are still under analysis.

Keywords. galaxies: individual (NGC 6868), galaxies: kinematics and dynamics, galaxies: stellar content

1. Introduction

Looking at the central part of nearby objects is important in order to map this region in detail and unveil what phenomena mediate the interaction between the central black hole and its host galaxy. The chosen galaxy for this study is NGC 6868 which is a cD galaxy and the central of the Telescopium group ∼40 Mpc ($1'' \sim 180$ pc).

Observations were carried out with the Gemini telescope using GMOS in the IFU mode. The data cube has 5×3.5 arcsec^2 with a spectral coverage ranging from 4260 to 6795 Å. The spatial resolution is $0.6''$ (∼100 pc). A Butterworth filter was applied.

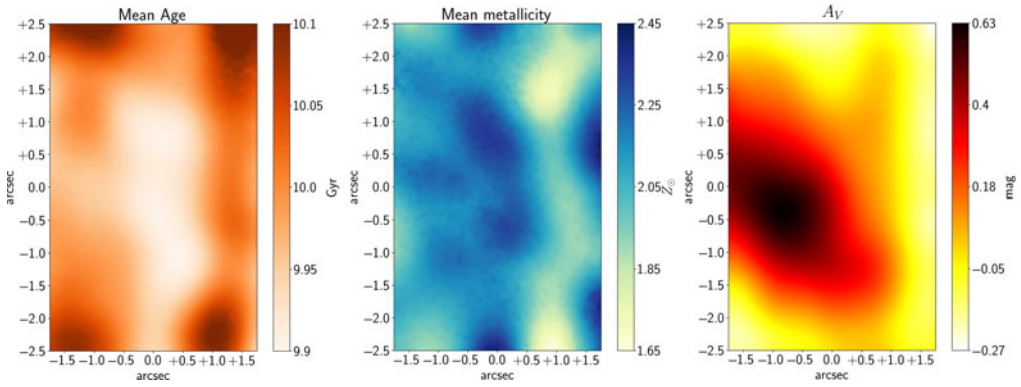

Figure 1. From left to right: the mean age, the mean metallicity and reddening in the V band.

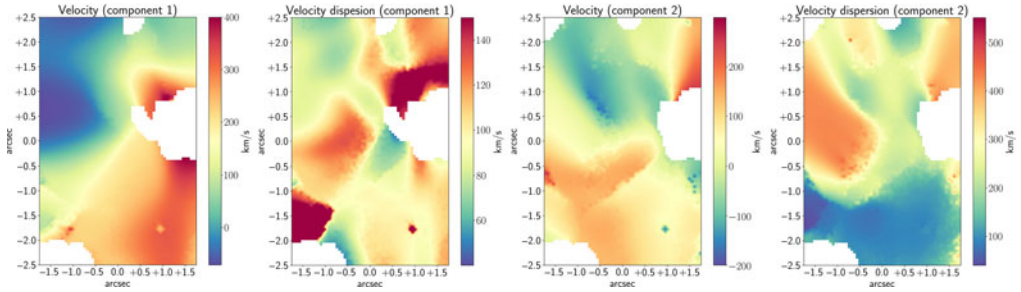

Figure 2. In the first two panels, the velocity and velocity dispersion of the rotation component, respectively. The last two show the same information for the second component.

2. Results

To derive the Star Formation History of our galaxy, we used the STARLIGHT code (Cid Fernandes *et al.* (2005)) to perform stellar population synthesis. Our Simple Stellar Population (SSP) base was composed with the latest MILES SSP models. As can be seen in figure 1, the populations that dominate are old (∼12.6 Gyr) and metal rich (2.6 and 1.8 Z⊙). The HOLMES (HOt Low-Mass Evolved Stars) could be the explanation for the LINER (Low-Ionization Nuclear Emission-line Region) emission observed (Stasińska *et al.* (2008)). The central region has a higher metallicity compared to the outer regions, in agreement with a successive enrichment of the interstellar medium. Also, no contribution of a power-law is found. As in Macchetto *et al.* (1996), the higher A_V towards the center probes a dust lane in the direction of the line of sight.

We analysed Hα λ 6563 Å and [NII] $\lambda\lambda$ 6548,6584 Å lines as they have a higher signal-to-noise ratio in our data. One of the most interesting regions is where the emission lines disappear or are below our detection limit, suggesting this is a Diffuse Ionized Gas region.

In order to understand the kinematics of the ionized gas, we fitted Gaussians to the emission lines using the IFSCUBE† package (figure 2). At the center of the galaxy one of the components has a rotation profile (probably a disc) whereas the other is a more turbulent one. Any broad component compatible with active galactic nuclei is identified.

† https://bitbucket.org/danielrd6/ifscube/src/master/

https://doi.org/10.1017/S1743921320001994 Published online by Cambridge University Press

3. Conclusions

The light emitted in the central region of NGC 6868 is mostly due to an old and metal-rich stellar populations (∼12.6 Gyr; 2.6 and 1.8 Z⊙). Also, a dust lane is present. We detected a probable DIG in the center of the galaxy. Also, the inner part of the object shows complex gas kinematics with an apparent rotation profile together with a turbulent component. No component compatible with a broad line region is detected.

References

Cid Fernandes, R., Mateus, A., Sodré, L., *et al.*2005, *MNRAS*, 358, 363
Macchetto, F., Pastoriza, M., Caon, N., *et al.*1996, *A&AS*, 120, 463
Stasińska, G., Vale Asari, N., Cid Fernandes, R., *et al.*2008, *MNRAS*, 391, L29

https://doi.org/10.1017/S1743921320001994 Published online by Cambridge University Press