GMOS IFU Spectroscopy of IRAS23199+0123

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Introduction

Ultra luminous infrared galaxies (ULIRGs) are between the most luminous objects in the universe (L ≈ 10^{12}Lo). The major part of their luminosity is emitted of infrared wavelenghts. These objects present disturbed morphology which suggests that they are gas rich e are undergoing collision processes or mergers.

ULIRGS are believed to represent a key stage on the evolution of galaxies in which tidal torques associated with mergers drive gas into the galaxy core, leading to starbursts and fueling and embedded AGN. In this work we used IFU spectroscopy with GMOS for a detailed study of the central region of IRASF23199+0123 in order to map the distribution and the kinematics of the ionized gas and analize possible evidences of inflows and outflows associated with AGN activity or Starburst. Preliminary results show that IRASF23199+0123 presents extended Hα and [NII] λλ 6562.8, 6584 line emission with the emission peak occurring in the center of the galaxy.

Observations

We used spectroscopic data obtained with the (Gemini Multi-Object Spectrograph) (GMOS), in the IFU (Integral Field Unit) mode.

The spectra cover the wavelength range of 5000 to 7500 Å over a field of view of 7 × 5 arcsec² e 3.5 x 5 arcsec²

The reduction process was done using routines of the GEMINI package in IRAF.

In order to construct maps for the emission line flux distributions and kinematics we fitted the line profiles by Gaussian curves. For the circumnuclear region, the line profiles are well reproduced by a single gaussian, while for the inner 0.8 arcsec, two gaussians are needed to properly model each line profile.

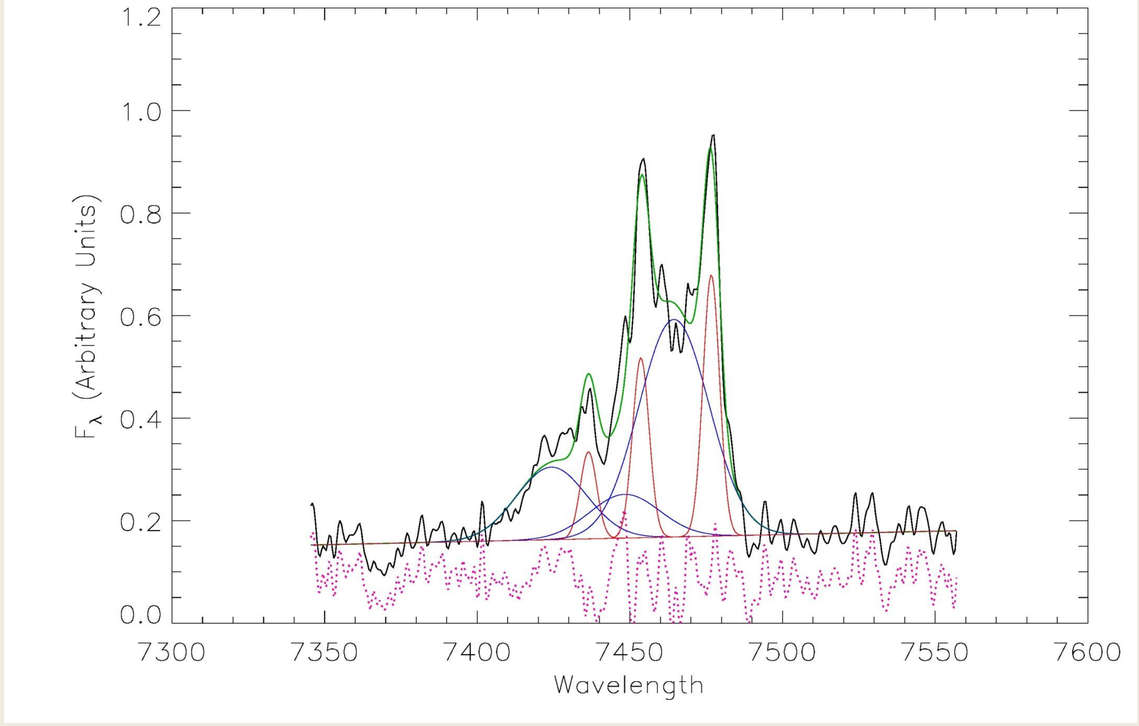

Figure 1: Sample fit for the nuclear region. The profile is shown in black, blue lines represent the blue (broad) component, red lines show the red (narrow) component, the green line shows the resulting fit and the dotted magenta lines shows the residuals of the fit plus an arbitrary constant.

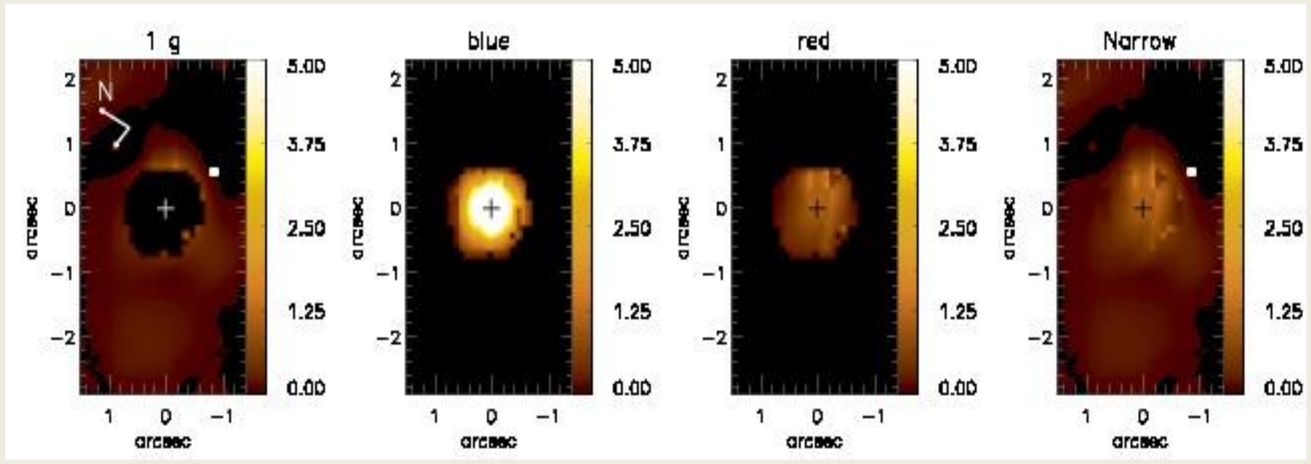

Figure 2: Flux maps for the [NII] λ6584 emission line obtained by the fitting of the emission-line profiles by Gaussian curves. The first panel on the left shows the flux map obtained by the fitting of one gaussian curve. The second and third maps show the fluxes for the broad and narrow component. The last map shows the flux of the narrow component (sum of the fluxes for the first and third panels).

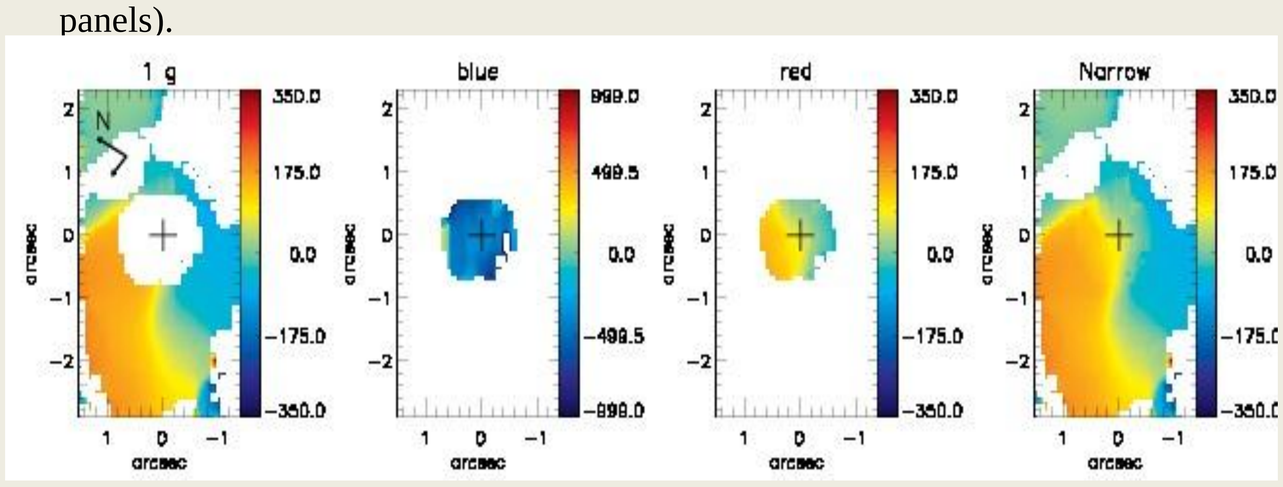

Figure 3: Same as figure 2, for the velocity fields.

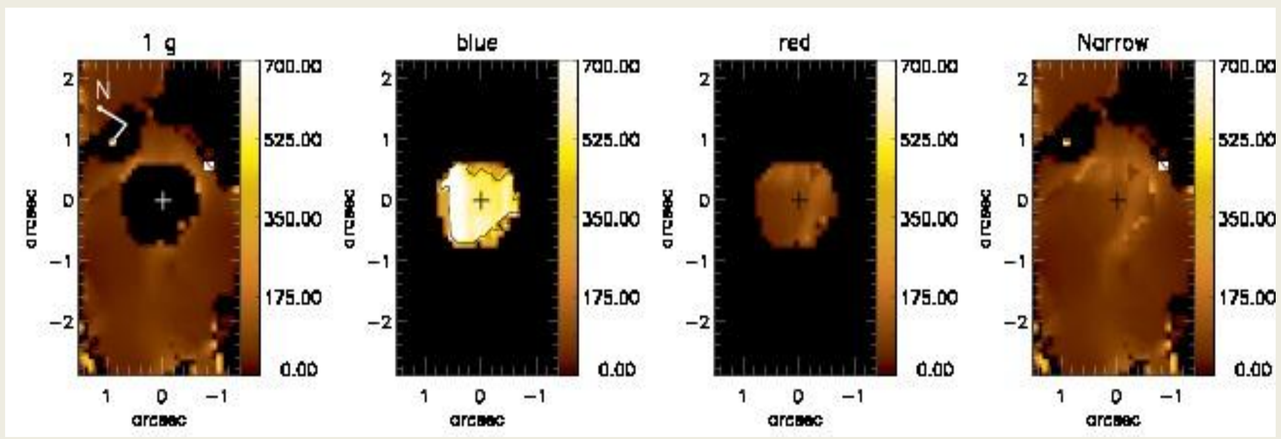

Figure 4: Same as figure 2 for the velocity dispersion.

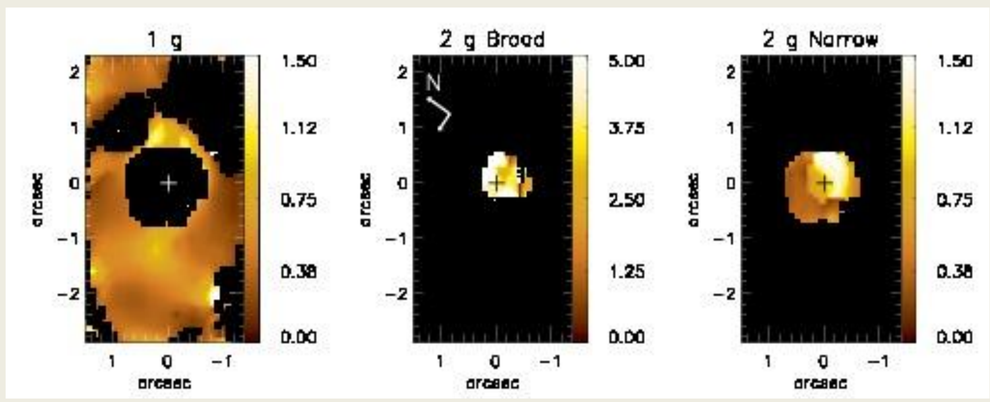

Figure 5: [NII]/Hα line radio for each component, suggesting that the broad component is originated by the AGN.

Conclusions

The main results of this work are:

- [NII] and Hα emission present similar flux distribution.
- The kinematics of the narrow-line component suggests that it is originated by gas located at the plane of the galaxy, with a velocity amplitude of 170 ≈ km/s.
- The broad component is attributed to outflows from the central AGN, with velocities of up to 800 km/s.