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REGIONES HII GIGANTES EN GALAXIAS DEL HEMISFERIO SUR

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Objectives:

➢To confirm the presence of Giant HII Regions in visible southern galaxies.

➢To determine the velocity dispersion (>13 km/s) which broadens the profile of the emission lines. And to study the correlation within the Luminosity versus Velocity Dispersion plane.



High-resolution spectra: Echelle spectroscopy

➢To study the fundamental parameters of giant HII regions: electronic temperature and density, and their metallicities, and evolutionary states.

➢To realize a comparative study of GHIIRs with different metallicities and different environments.



Long-slit spectroscopy

➢ Using narrow-band CCD photometry, Feinstein (1997) analyzed the brightness distribution in a sample of visible spiral galaxies in the southern sky.

The most luminous HII regions of Feinstein (1997) are our first candidates to study.

➢ In Firpo et al., (2005) we confirmed the giant nature of three candidates to giant HII regions in the southern sky. We continue our detailed analysis of GHIIRs in local universe galaxies:

Spiral galaxies: NGC 2997, NGC 4602, NGC 5861, NGC 6070, NGC 7479, NGC 7552

From photometry of emission lines, we have selected bright knots in low-metallicity galaxies, as blue compact dwarf galaxies (BCDs).

BCDs: Haro15, Mrk600, IIZw33, Tol1924-416 y Tol1937-423

➢ We have selected a sample of the brightest HII regions from two spiral galaxies: NGC 7479 and NGC 6070 (Firpo et al., in preparation).

➢ High resolution spectra for selected GHIIRs in NGC 7479 and NGC 6070, three in each one, were obtained using the echelle spectrograph at the 100-inch Irénée du Pont Telescope, LCO (Las Campanas Observatory), July 19-22, 2006.

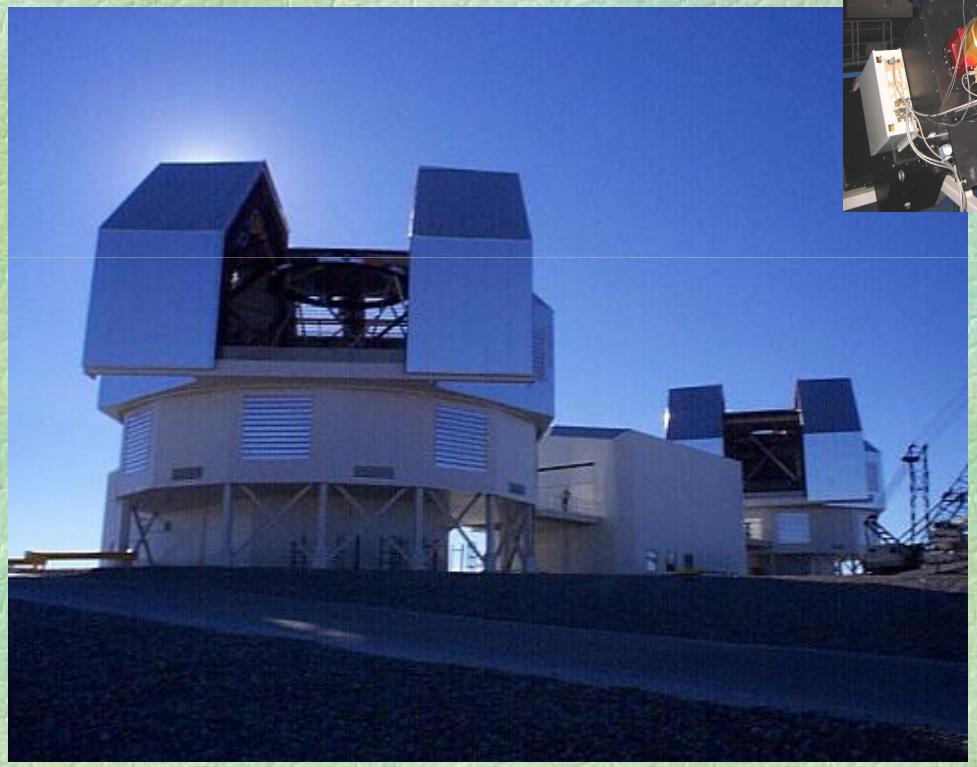


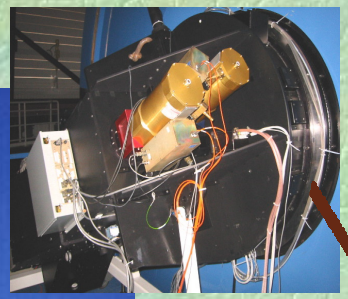


The spectral range:
3800Å - 9500Å

The spectra resolution:
R≈44300, ●=0.122Å px^{-1}
at 5400Å,
equivalent to 6.72 km s^{-1} px^{-1}

- We have also obtained high resolution spectra for the three HII regions in the NGC 6070 galaxy using the echelle double spectrograph Magellan Inamori Kyocera Echelle (MIKE) at the 6.5-m Magellan II (Clay) Telescope, LCO, July 2004.



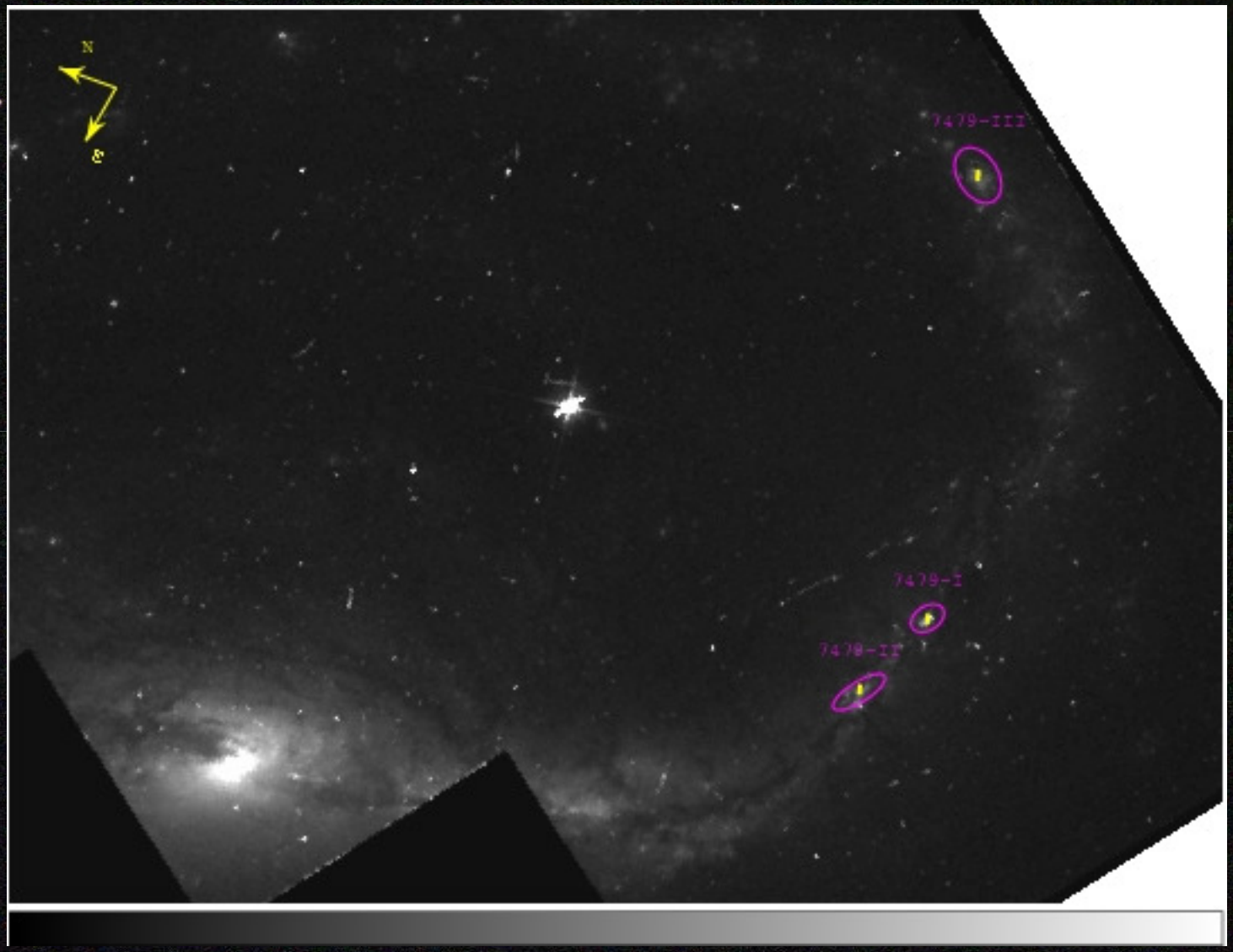




The spectral range:
3500Å - 5000Å
4500Å - 7500Å

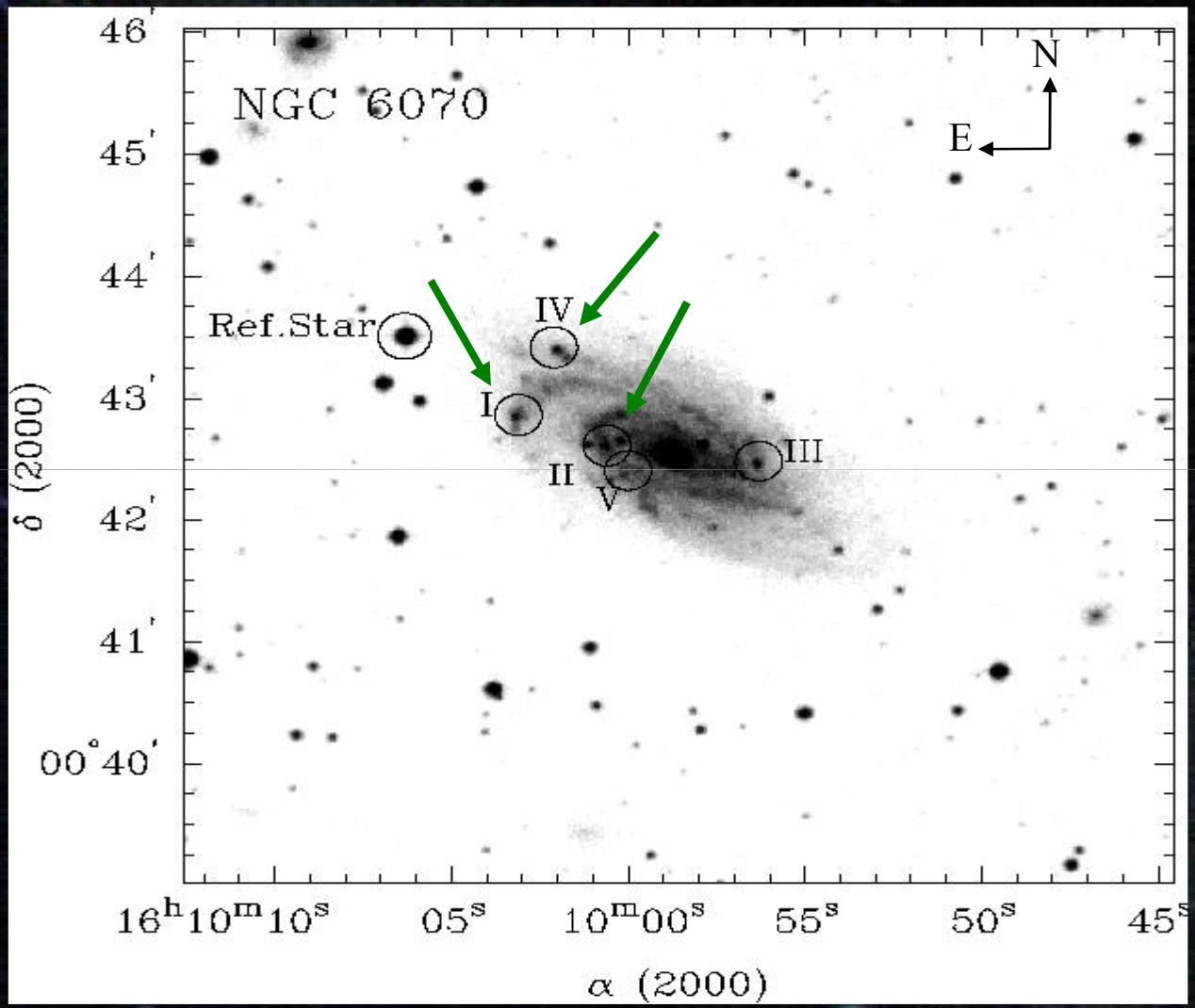
The spectral resolution for MIKE instrument configuration
R☝138500, 👎●🖬0.039Å px^{-1} at 5400Å,
equivalent to 2.14 km s^{-1} px^{-1}

NGC 7479 (SBc)

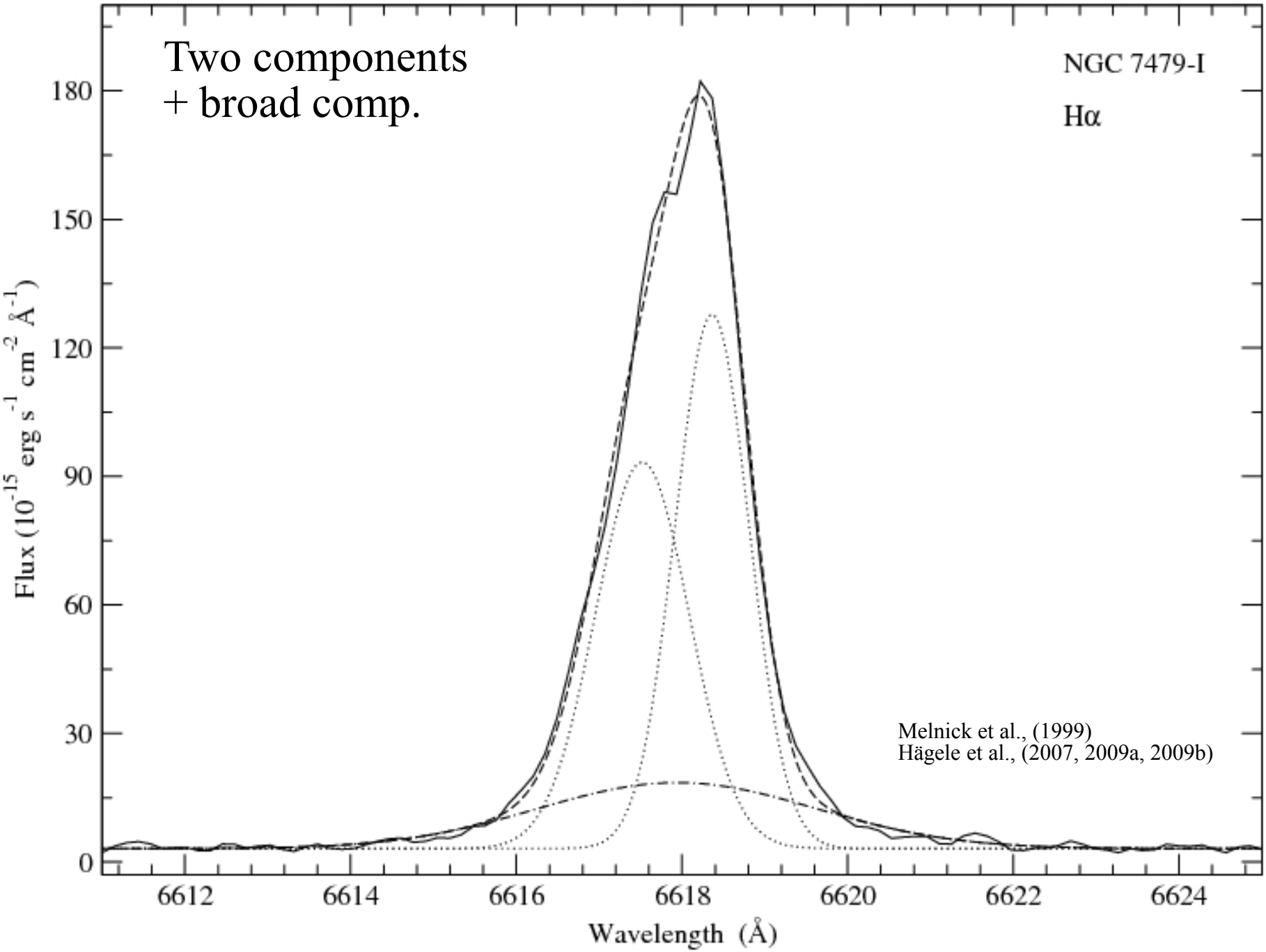


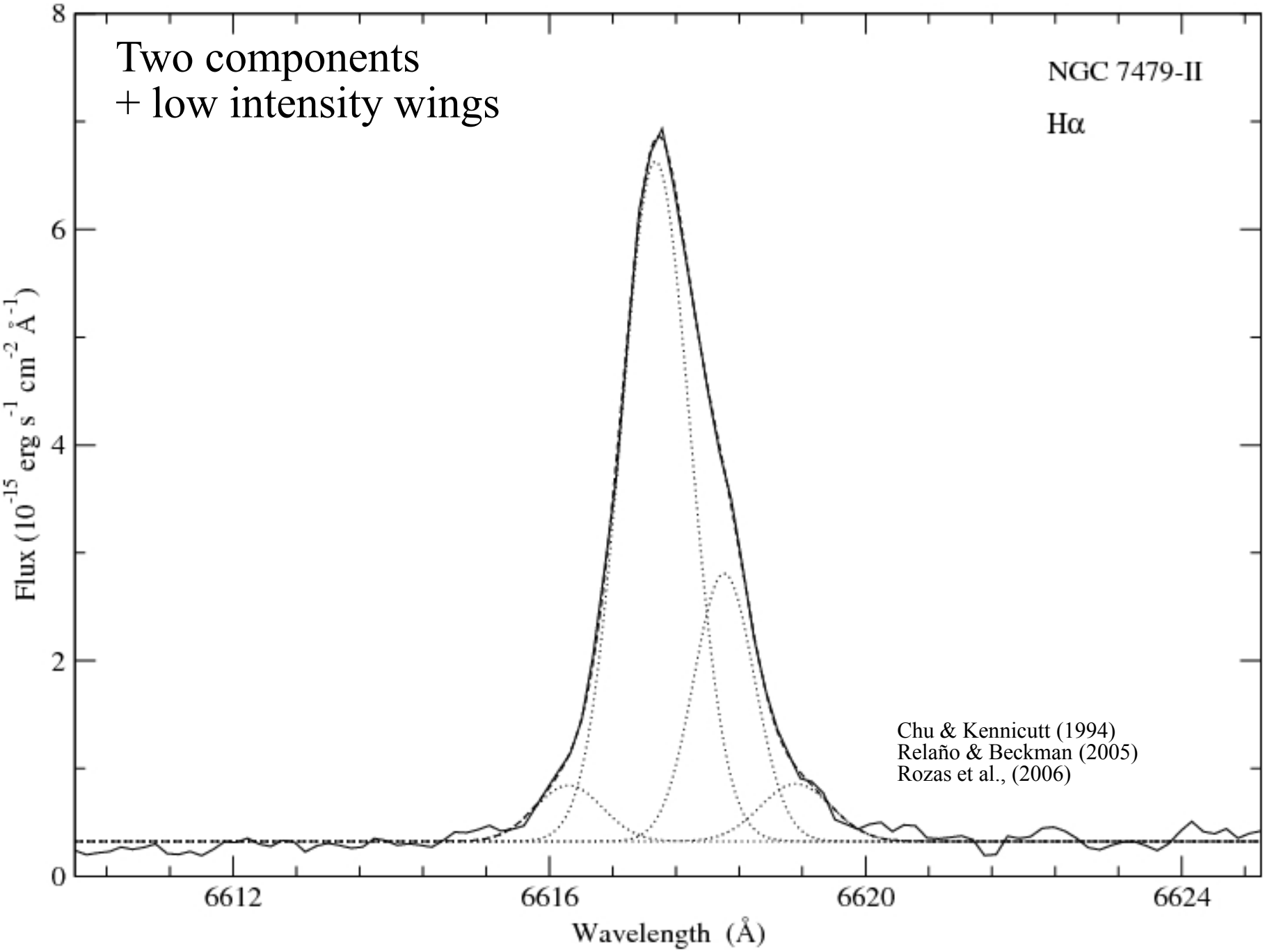
Z=0.007942 , 27.5 Mpc

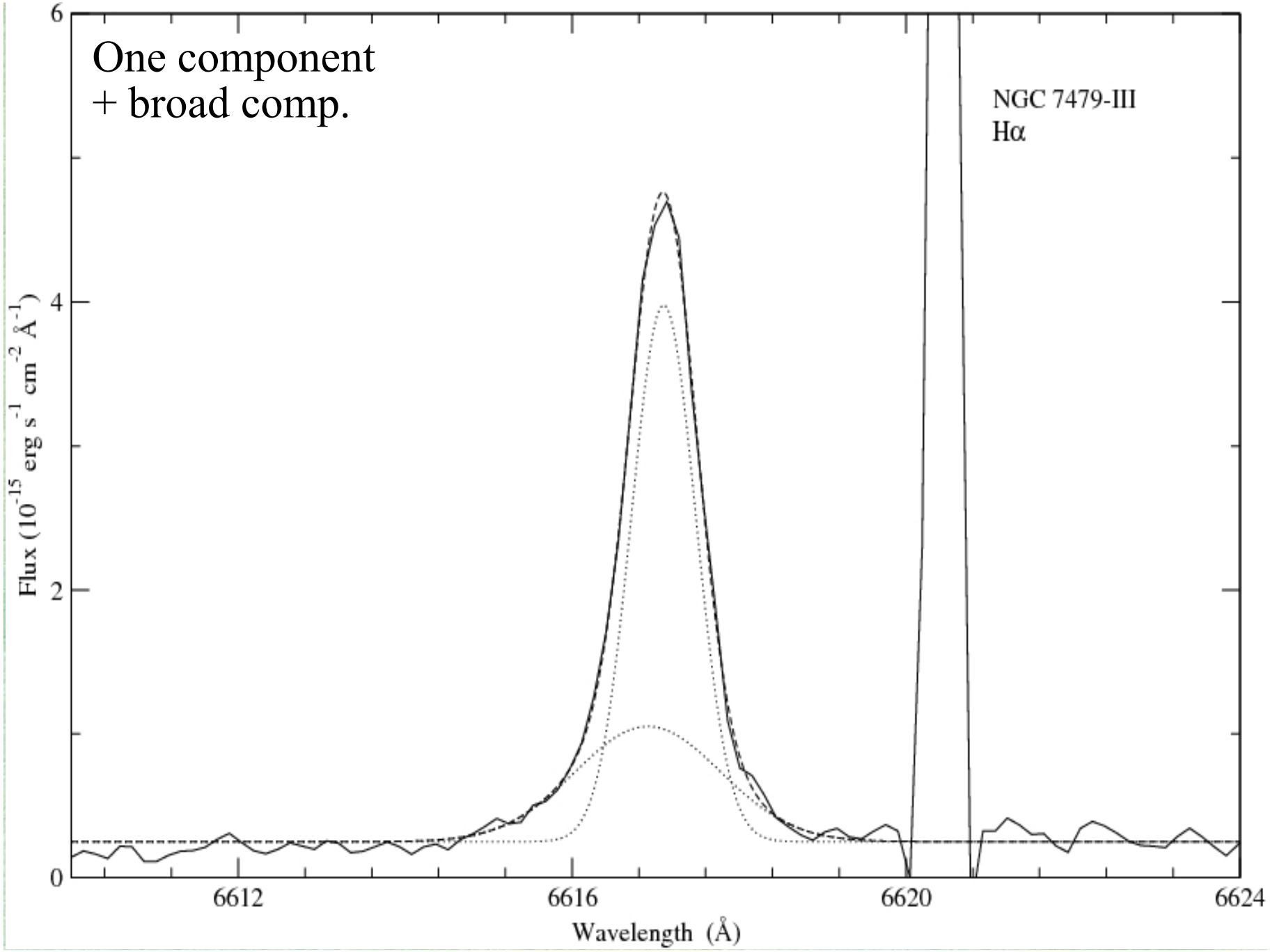
NGC 6070 (SAcd)



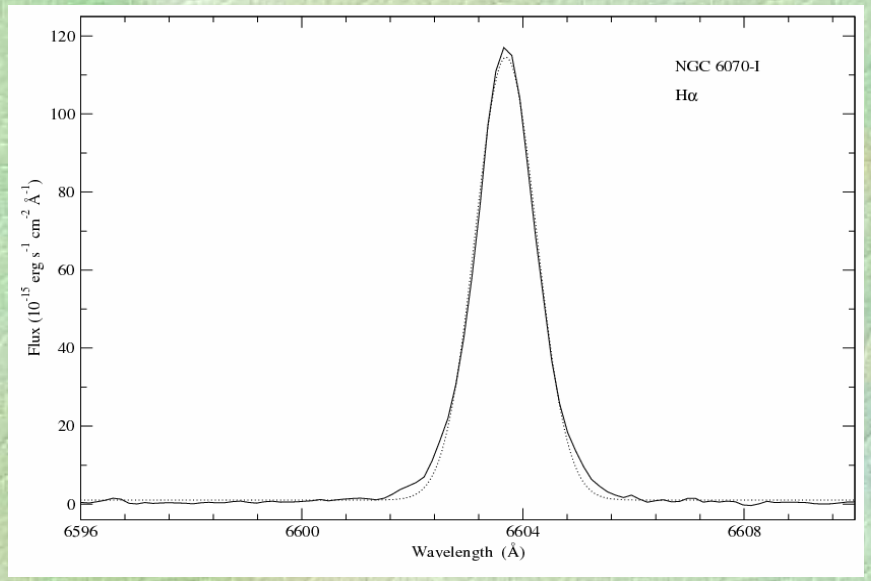
Z=0.006685, 29.85 Mpc

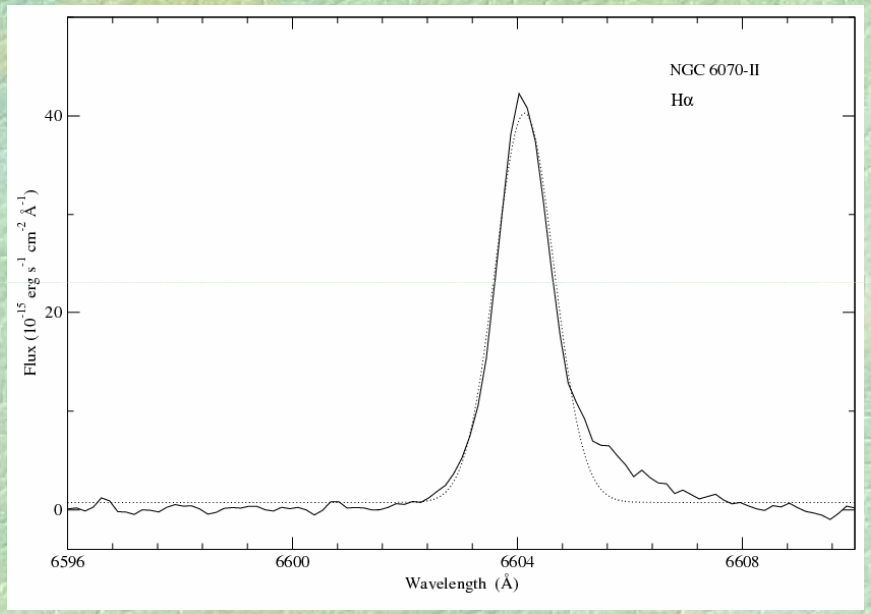

Two components
+ broad comp.
NGC 7479-I
Hα
Melnick et al., (1999)
Hägele et al., (2007, 2009a, 2009b)
Flux (10^{-15} erg s^{-1} cm^{-2} Å^{-1})
Wavelength (Å)
0
30
60
90
120
150
180
6612
6614
6616
6618
6620
6622
6624

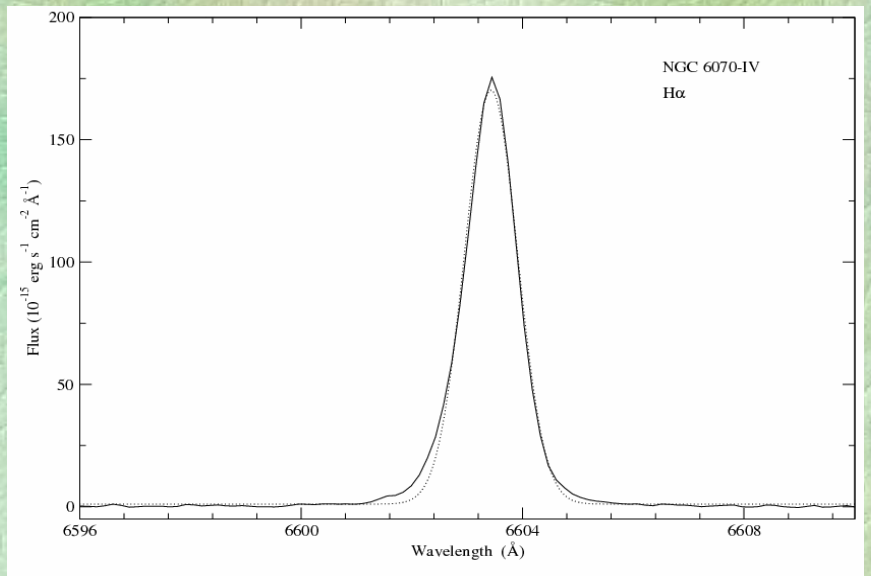

Two components
+ low intensity wings
NGC 7479-II
Hα
Chu & Kennicutt (1994)
Relaño & Beckman (2005)
Rozas et al., (2006)
Flux (10^{-15} erg s^{-1} cm^{-2} Å^{-1})
Wavelength (Å)
0
2
4
6
8
6612
6616
6620
6624


One component
+ broad comp.
NGC 7479-III
Hα
Flux (10^{-15} erg s^{-1} cm^{-2} Å^{-1})
Wavelength (Å)
0
2
4
6
6612
6616
6620
6624

NGC 6070, du Pont

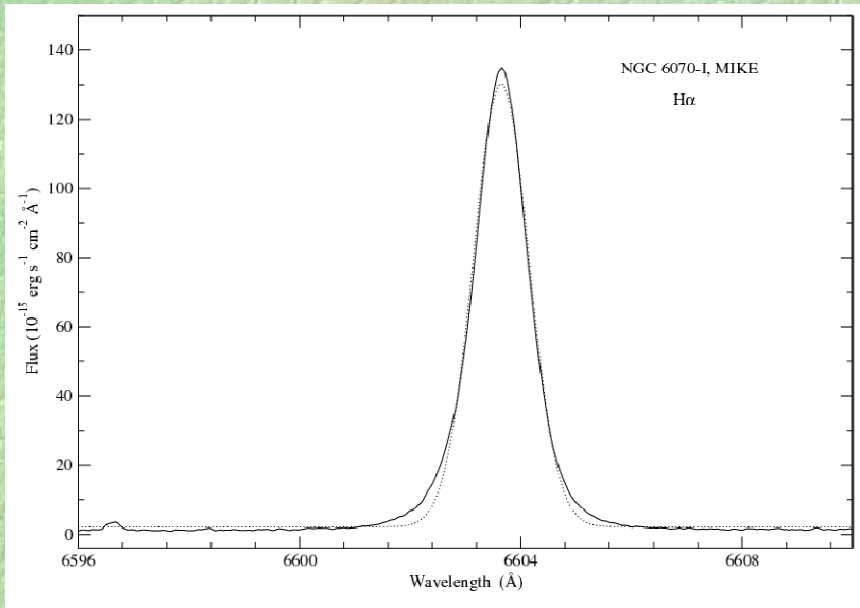


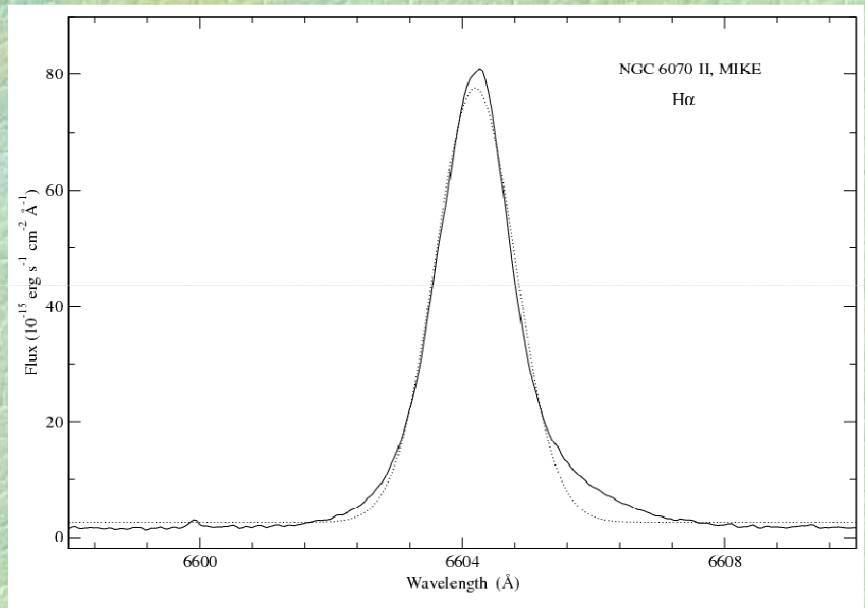


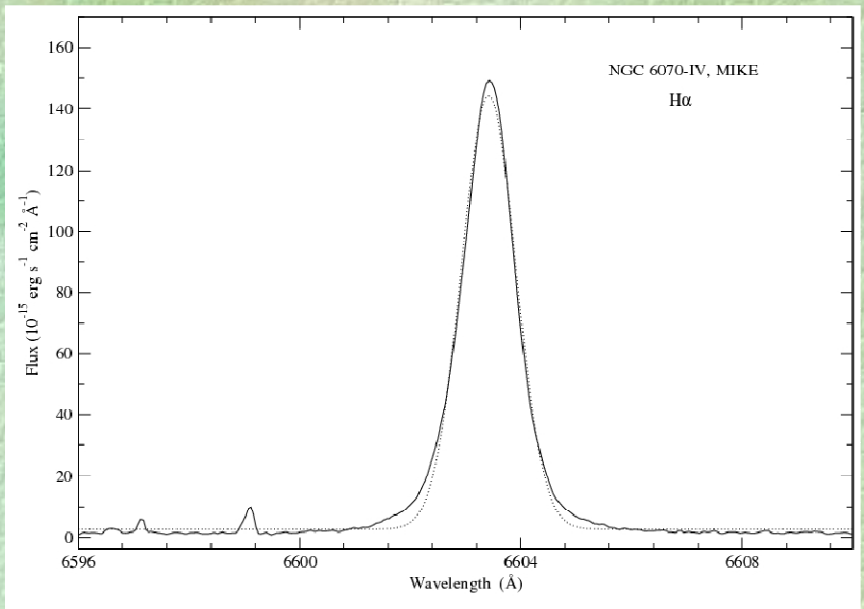


One component

NGC 6070, MIKE



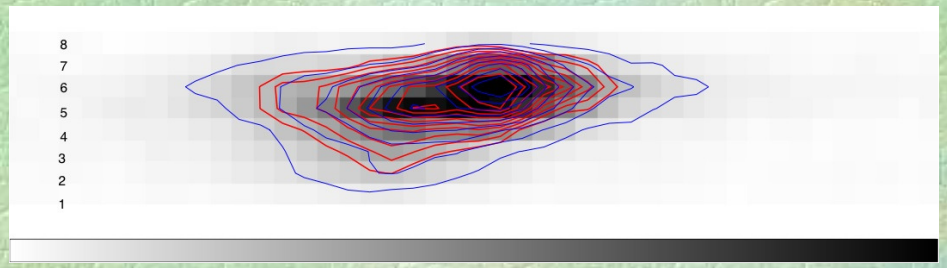




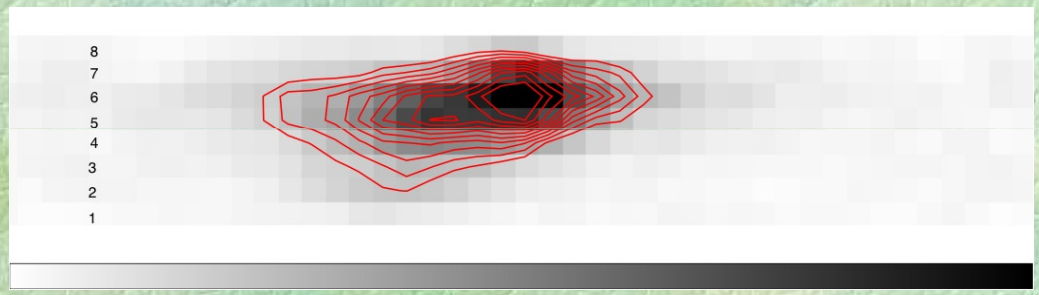
One component

NGC 7479-I

2D velocity images



2D Hα velocity image with [NII]6584 and [SII]6717 contours overlapped.



2D [NII]6584 velocity image with [SII]6717 (red) contours overlapped.



2D [SII]6717 velocity image with [NII]6584 (blue) contours overlapped.



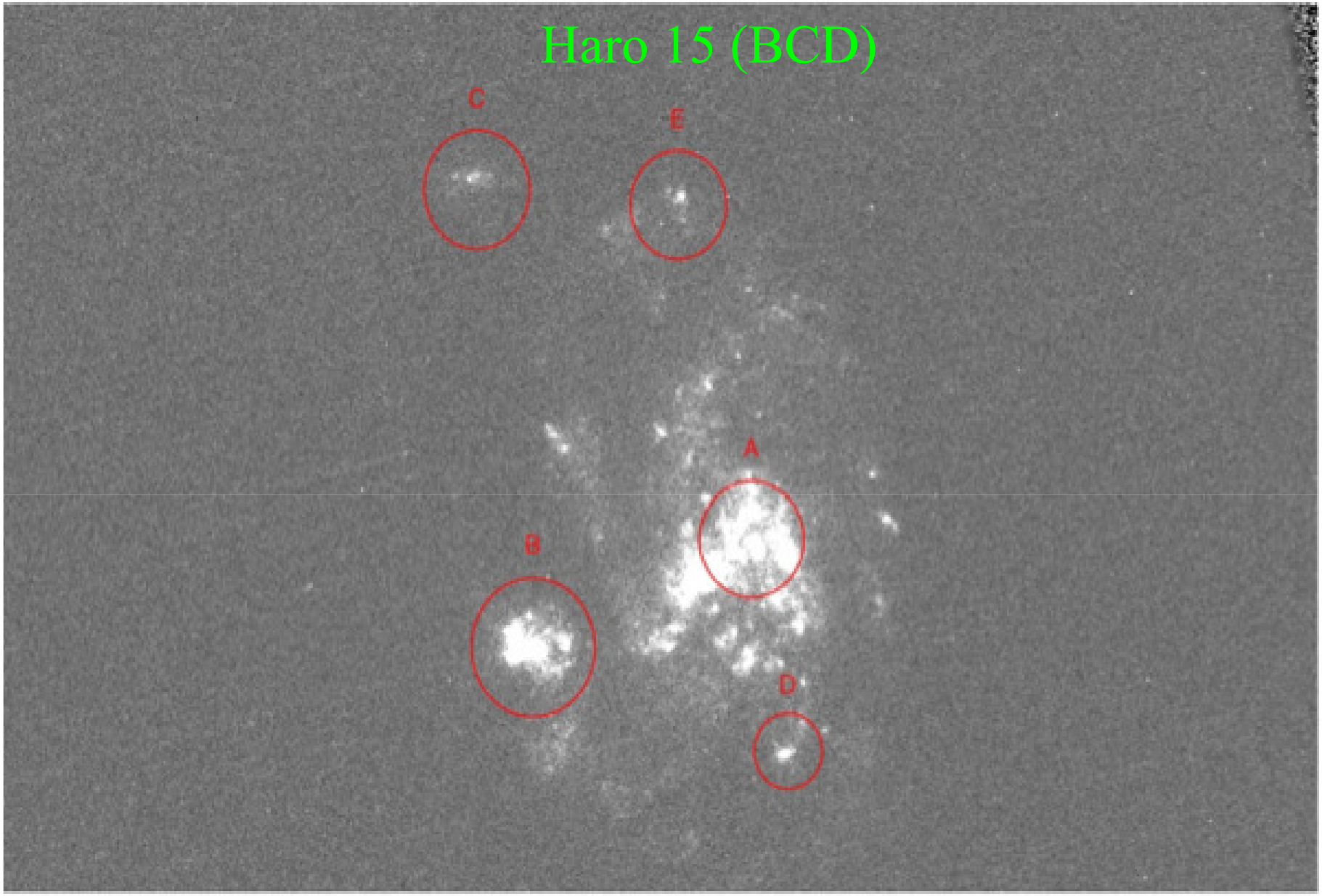
Summary

From new high resolution spectra of the HII regions NGC7479-I, NGC7479-II, NGC7479-III, NGC6070-I, NGC6070-II and NGC6070-IV obtained at the 100-inch du Pont Telescope, LCO, we have confirmed the giant nature of all these regions.

In this GHIIRs sample, we found that two of them (NGC7479-I, NGC7479-II) revealed the presence of two separated kinematic components in all analized profiles and NGC7479-I shows evidence of one broad component. For this region, we can also generate 2D velocity images in H♋, [NII]6584 and [SII]6717 lines. These images show that the two components are resolved spatially and the kinematical information contributes to split the knot in the velocity spatial plane.

In NGC7479-II region we could fit two separatly wings of the two brightest component profiles.

In the rest of studied HII regions, we found only one single Gaussian component, with no evidence of multiple contributions or emission excess on the wings of the emission lines.



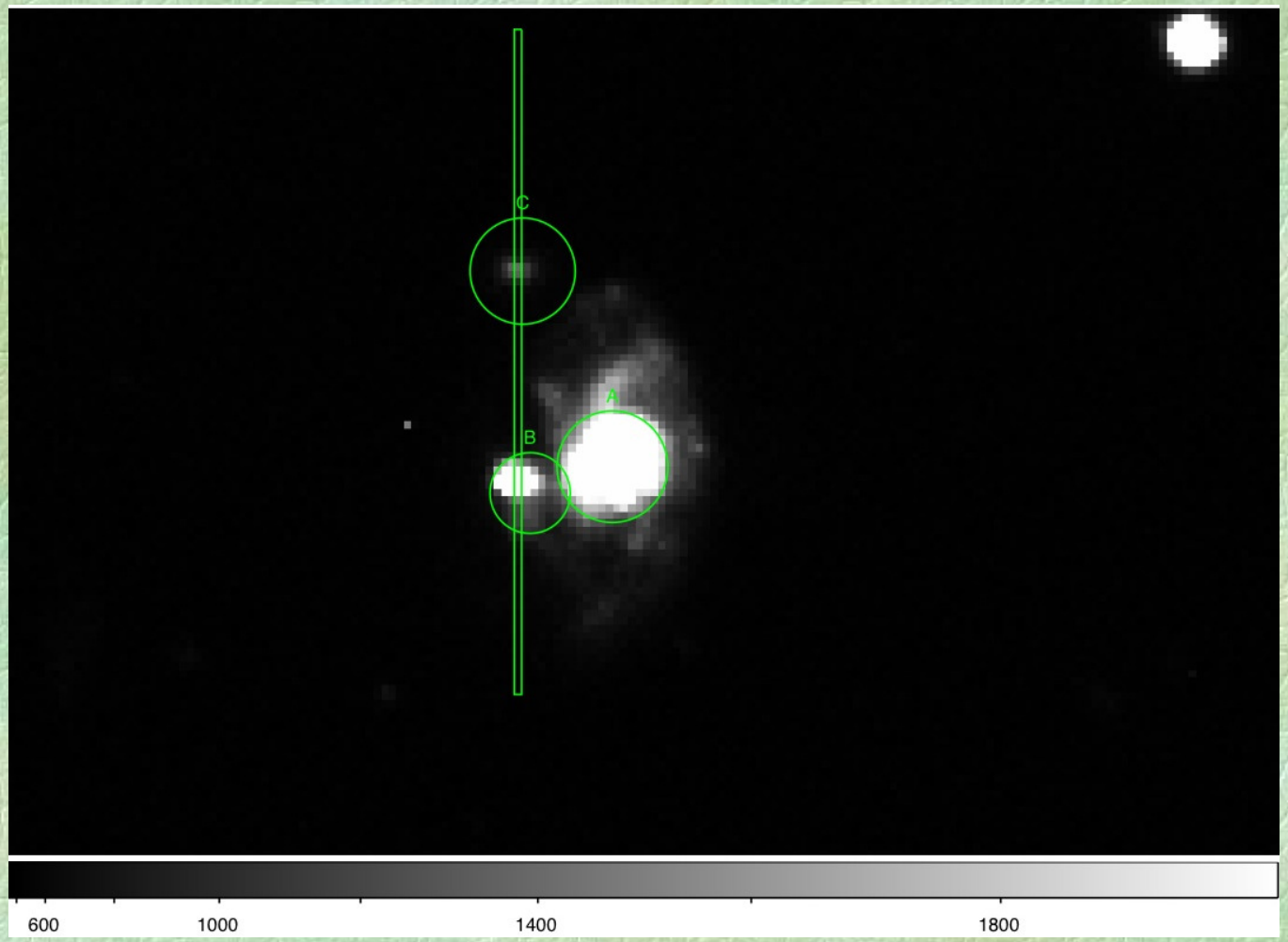
Collaborator: Ángeles Díaz

Z=0.021371, 88.3 Mpc

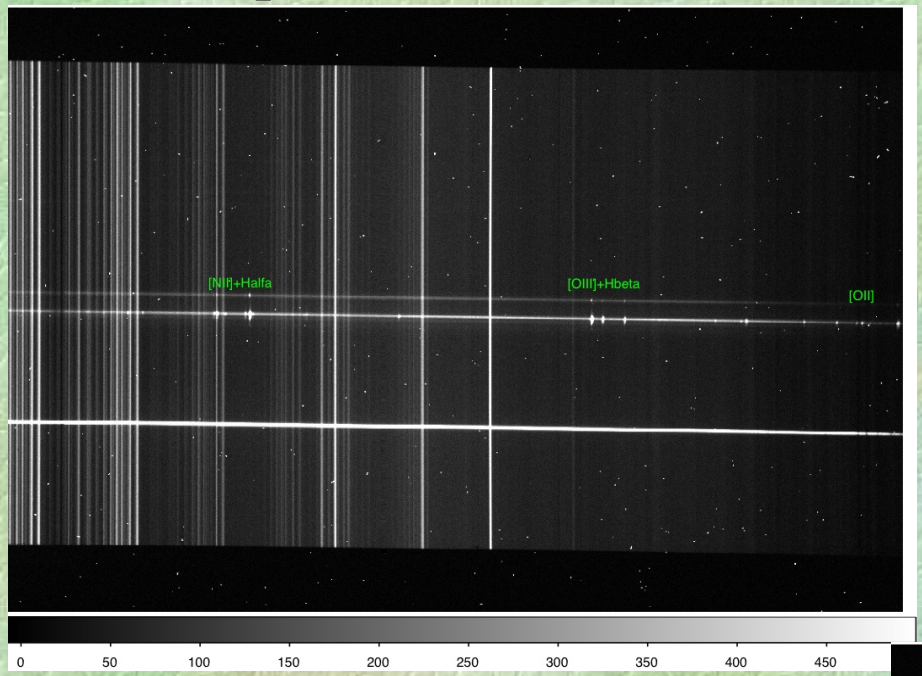
.5 3 4 5

du Pont (2005) WFCCD

$\Delta\lambda$= 4.2 Å px^{-1} at 5400Å, 7km s^{-1} px^{-1}
slit de 1”

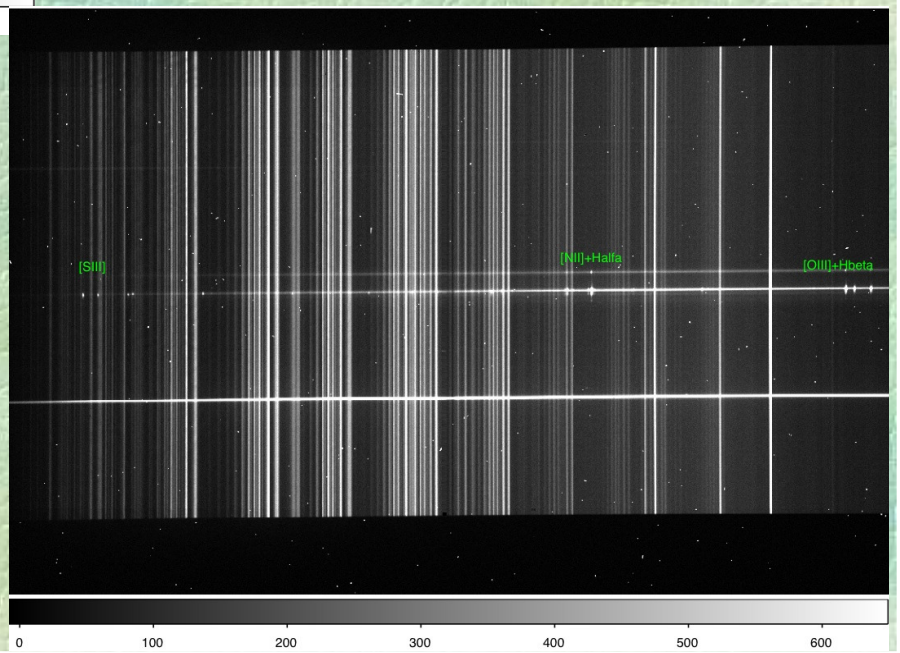


Blue spectrum

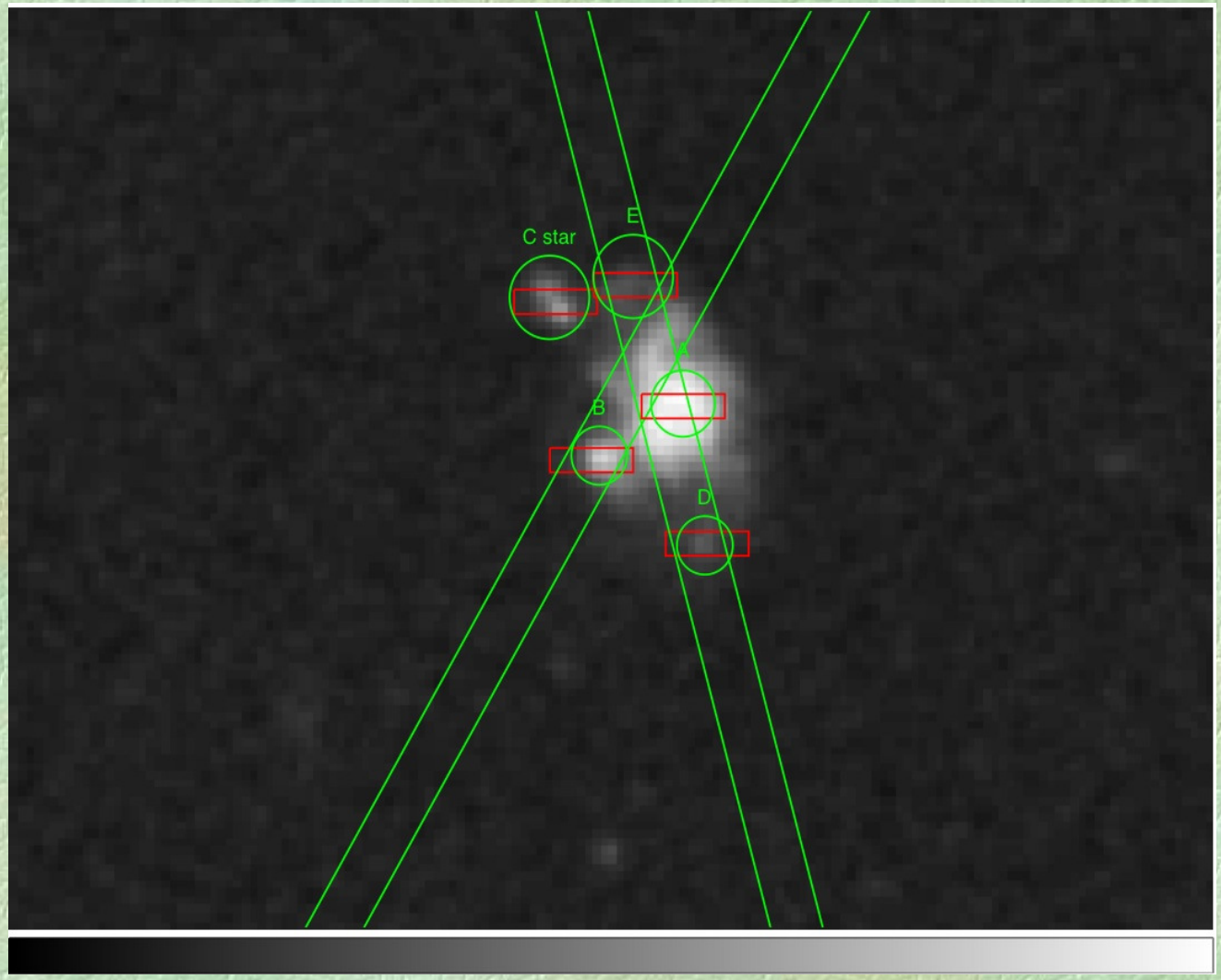


The spectral range:
3780Å - 9300Å

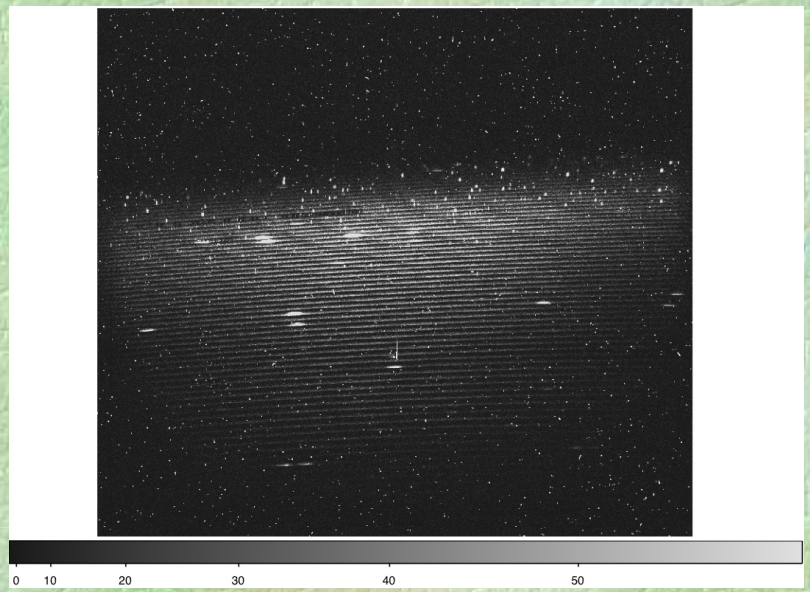
Red spectrum



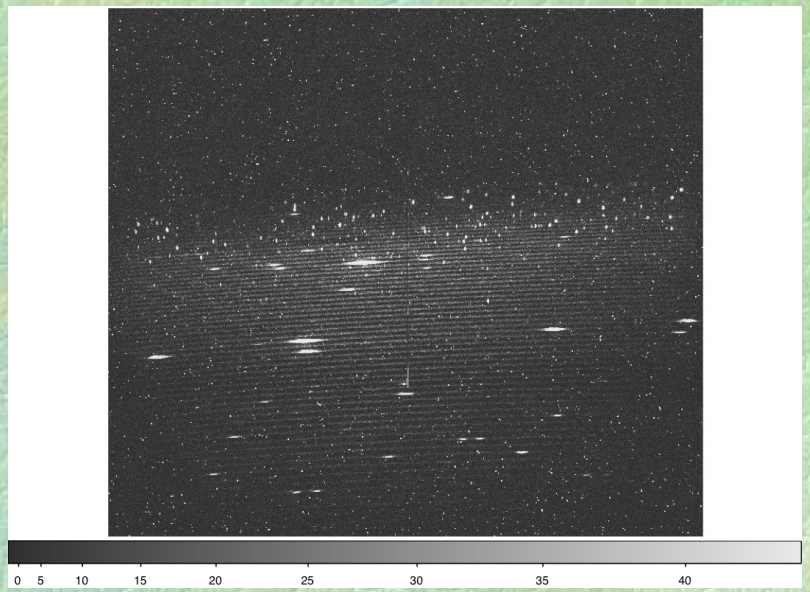
du Pont (2006) Echelle $\Delta\lambda$= 0.148 Å px^{-1} at 6600Å, 6.72 km s^{-1} px^{-1}
slit 1”x4”



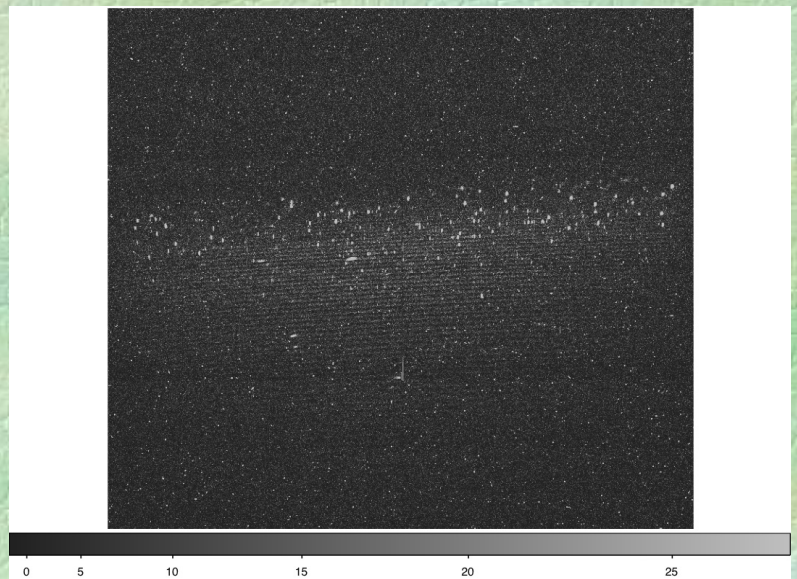
Haro15 A^{L}



Haro15 B^{L}

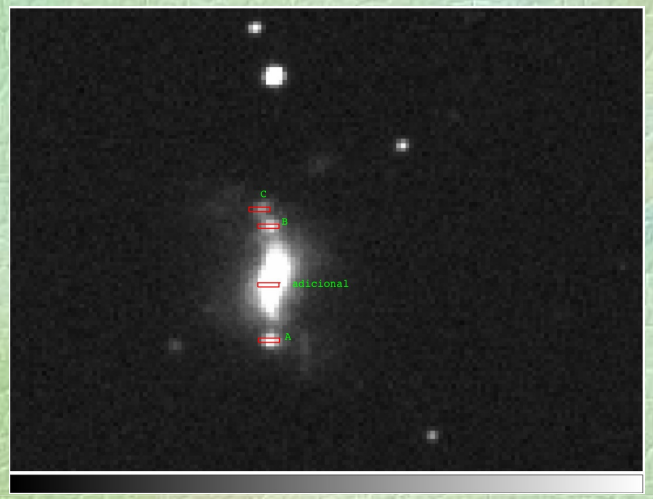


Haro15 C^{L}

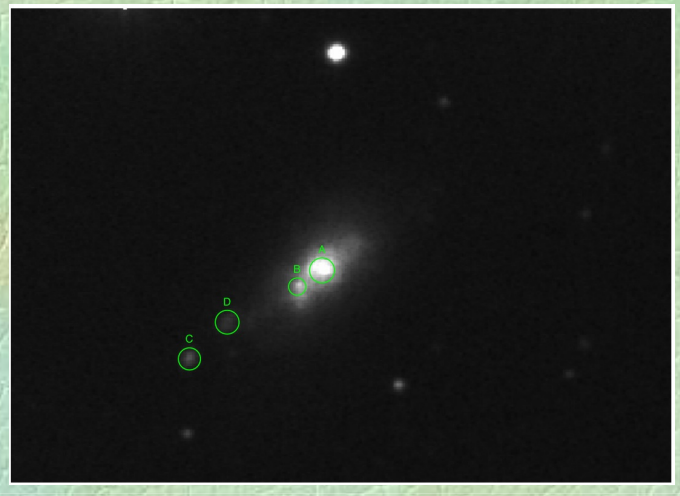


The spectral range:
3600Å - 9900Å

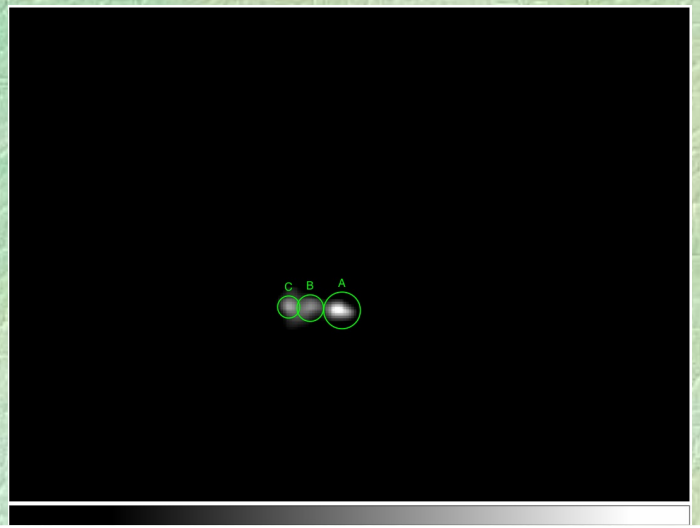
IIzW33

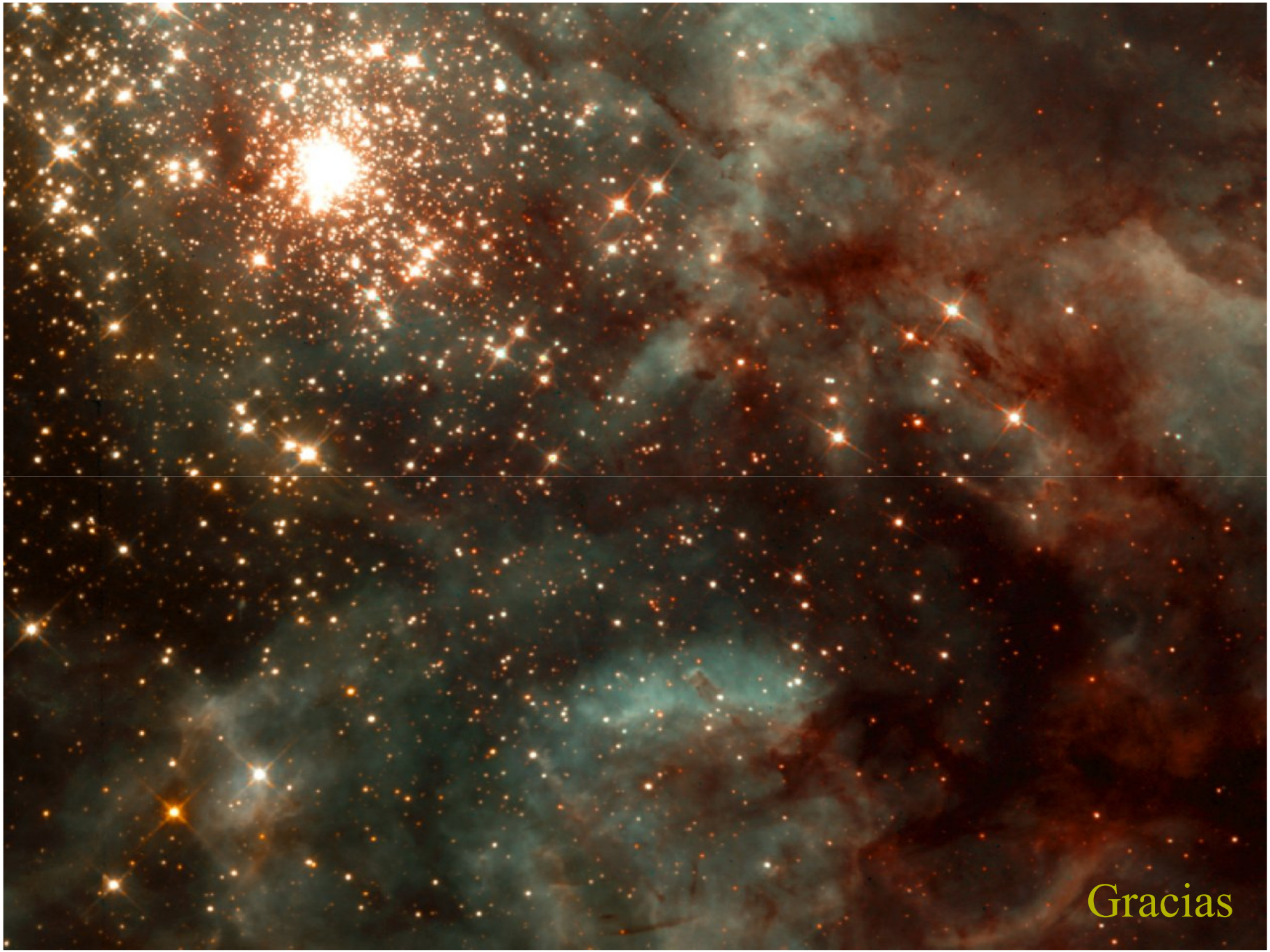


Mrk600



Tol1924-416




Gracias

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