Starbursts in Galaxies

Third Meeting of the First Project

Star Formation & Structures in Galaxies (Estallidos III)

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

Objectives (proposed)

- Dynamics, Kinematics & Structures of SBGs or GHSBs
- Dynamics, Kinematics & Spatial Structures of SBs in the MW and close Galaxies
- Structures in DGs? Connection with SFPs
- IMF: Remnant of the Gas Structure or Signature of the SFPs?
- Fine Tools

Results (Scheme)

Given the high number of contributions, the project seems to go right. Let it see,

1; Dynamics, Kinematics & Structures of SBGs or GHSBs

Structural Parameters of Galaxies
(Prieto et al.)

Kinematical Structure:
Measurements of the Pattern Speeds in Barred Galaxies (Aguerri et al.)

Current SF pattern:

Star Formation in Galaxies from the GALEX Point of View (Iglesias-Páramo et al.)
Spatial Distribution of Lyman-a Emission (Mas-Hesse et al.)
XMM-Newton Observation of NGC 1808 (Jiménez et al.)

Star Formation History & Tools:
Characterizing the stellar populations of spiral galaxies (Mollá et al.)
Fitting Parametric Models to Multi-Color Photometry (Muñoz-Apellániz)

2;Dynamics, Kinematics & Spatial Structure of SBs in the MW and close Galaxies

Star Clusters (Starburst Cores ?)
Star Cluster Outflows and their X-ray Emissions (Silich et al.)

SBs in Galaxies
Integral 3D Spectroscopy of a Starburst in NGC 6946 (Alfaro et al.)

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

3;Structures in DGs? Connection with SFPs

Star Formation Pattern & Star Formation History
The Luminosity Structure of Stellar Host in BCDs (Caón et al.)
Star Formation Knots in a Sample of BCDGs (Martínez-Delgado et al.)

Structures & Tools
2D fits, a better tool for analyzing BCDS (Amorín et al.)

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

4; IMF: Remnant of the Gas Structure or Signature of the SFPs?

Structure of the clouds & Tools:

The Fractal Dimension of Projected Clouds (Sánchez et al.)

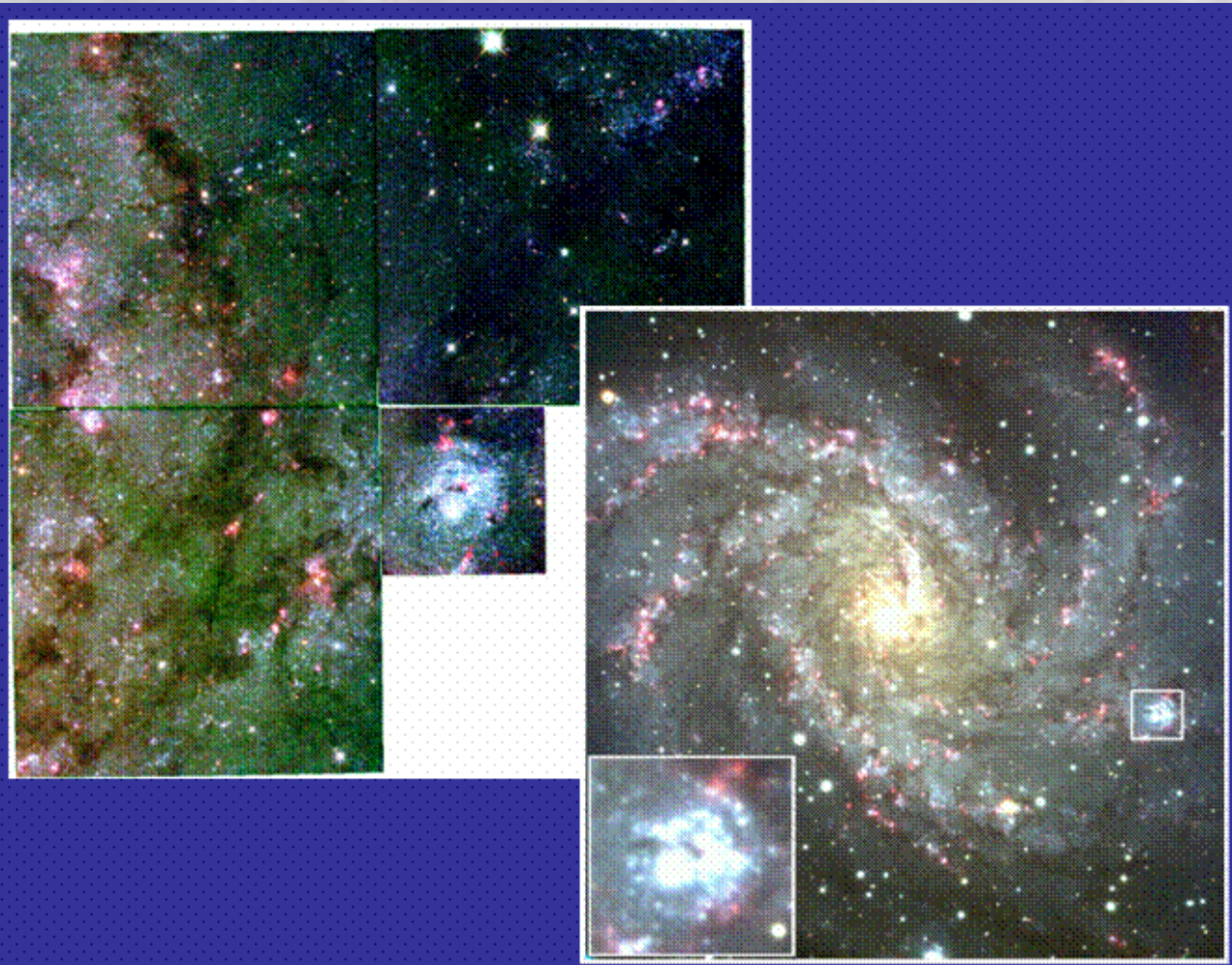
We´ll miss Cerviño for other aspects of the IMF

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

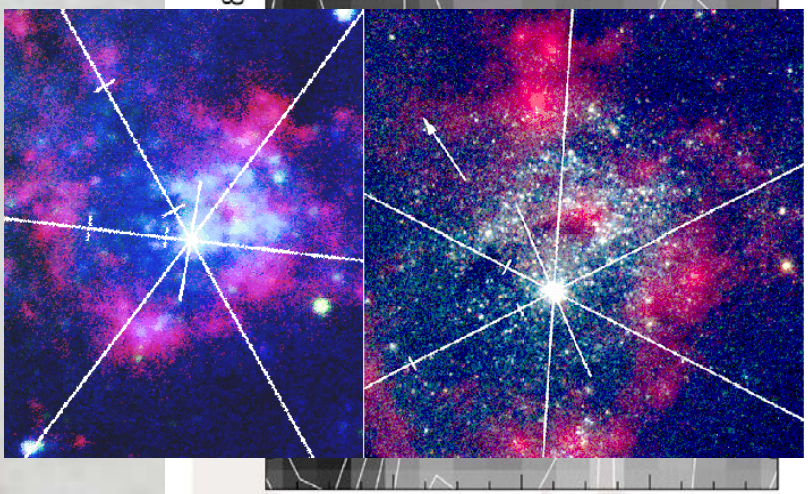
NGC 6946 (García-Lorenzo, Efremov & Muñoz-Tuñon)

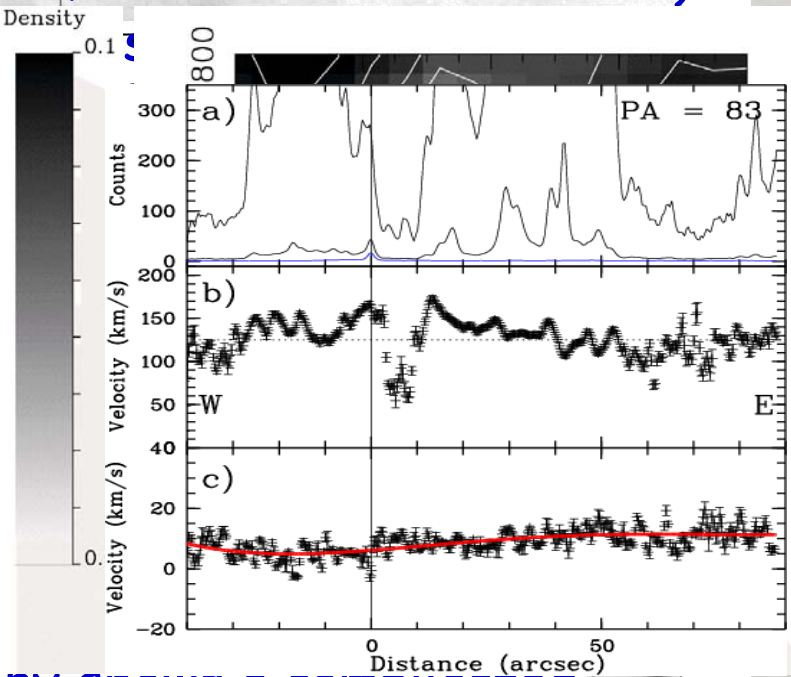
- Sta
- Hig
outer
- Hig
conto
- Hig
- Mar
- Son



The

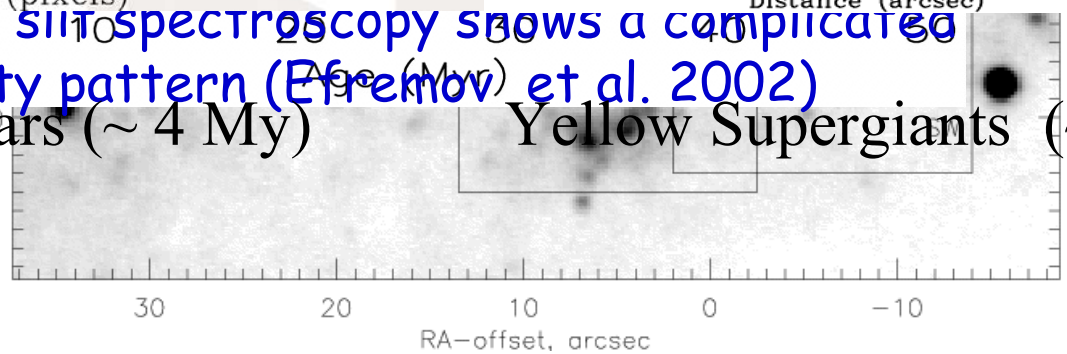
- NGC 6946 contains a peculiar star formation region about 600 pc of diameter at 5 kpc SW from the center (Hodge 1967; Larsen & Richtler 1999).





- Long slit spectroscopy shows a complicated velocity pattern (Efremov et al. 2002)

OB MS Stars (~ 4 My) Yellow Supergiants (~ 25 My



Mercedes Prieto
Emilio J. Alfaro (

Questions

Modes of star formation: Different physical conditions of the gas could favour the generation either of

- Isolated stars

or

- Stellar clusters

Formation of massive clusters

- Which order it?

Propagation of the star formation throught the complex

- Pattern of ages

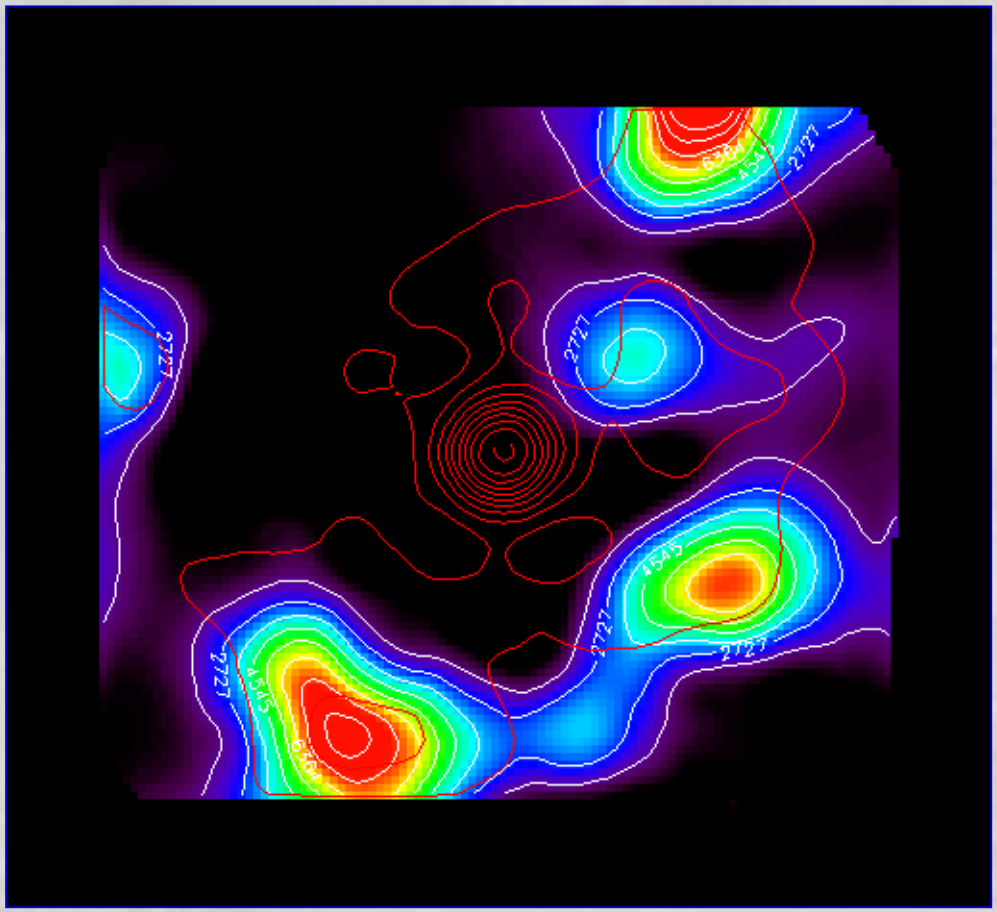
Observations

INTEGRAL + WYFFOS + WHT (Roque de los Muchachos, Canary Islands, Spain)

Fiber Bundle SB3 (135 fibers; 2.7 arsec Ø each, FOV ~ [30 x 30 arsec^2]).

Two ranges of wavelength centered at 5250 Å (4500-6000) and 6565 Å (5812-7320) were obtained (R~1200).

Hα (color image) + V (red contours)



North at the top
East at the left

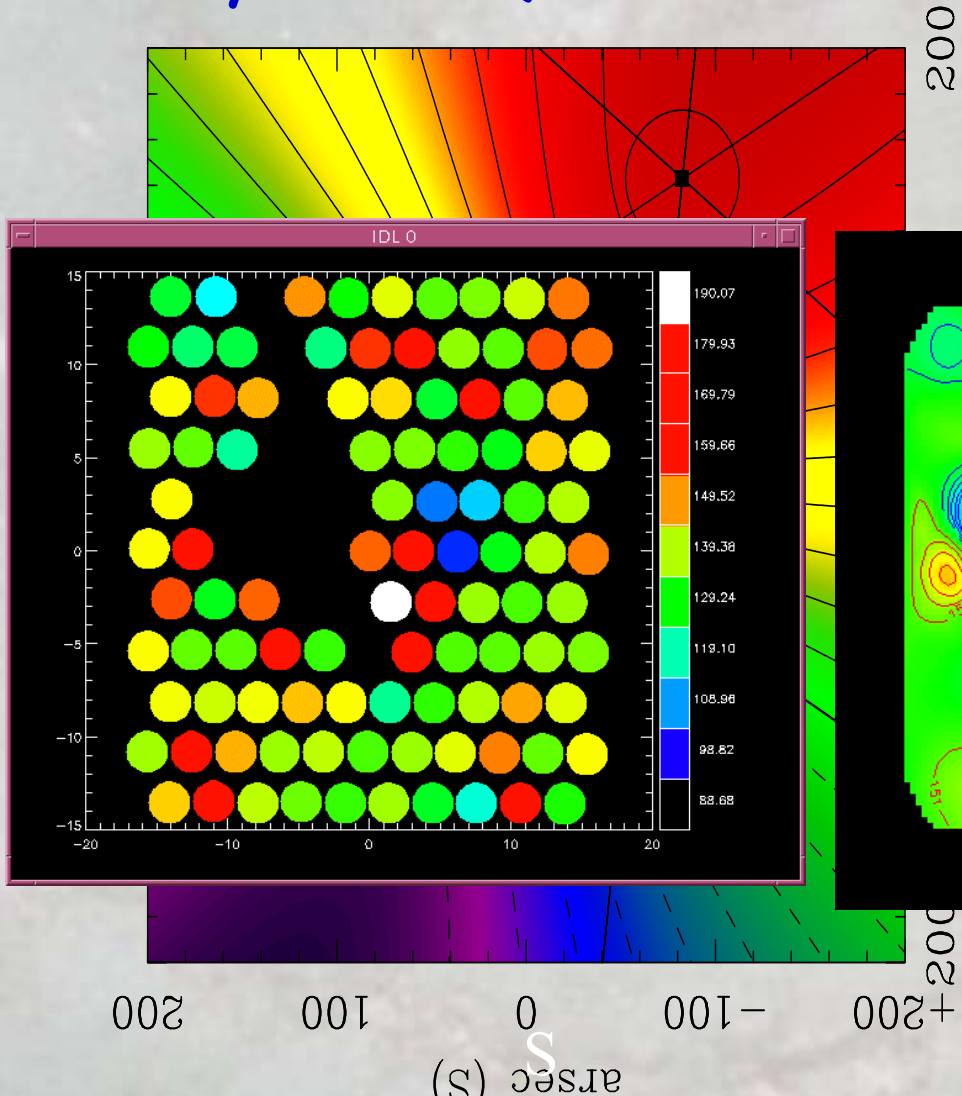
Centered at
20h 34m 32s
60° 08′ 14″

32 arsec

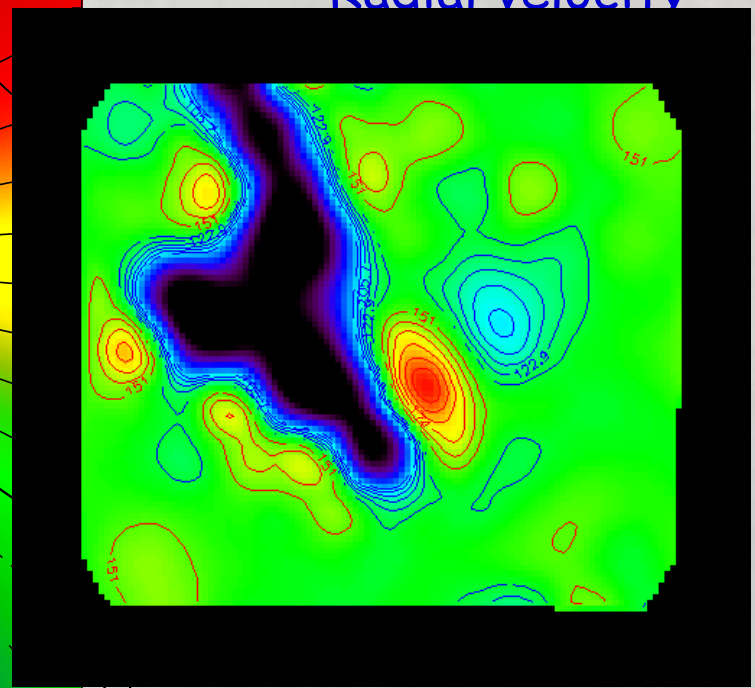
Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

Velocity field (Hα + NII + SII)



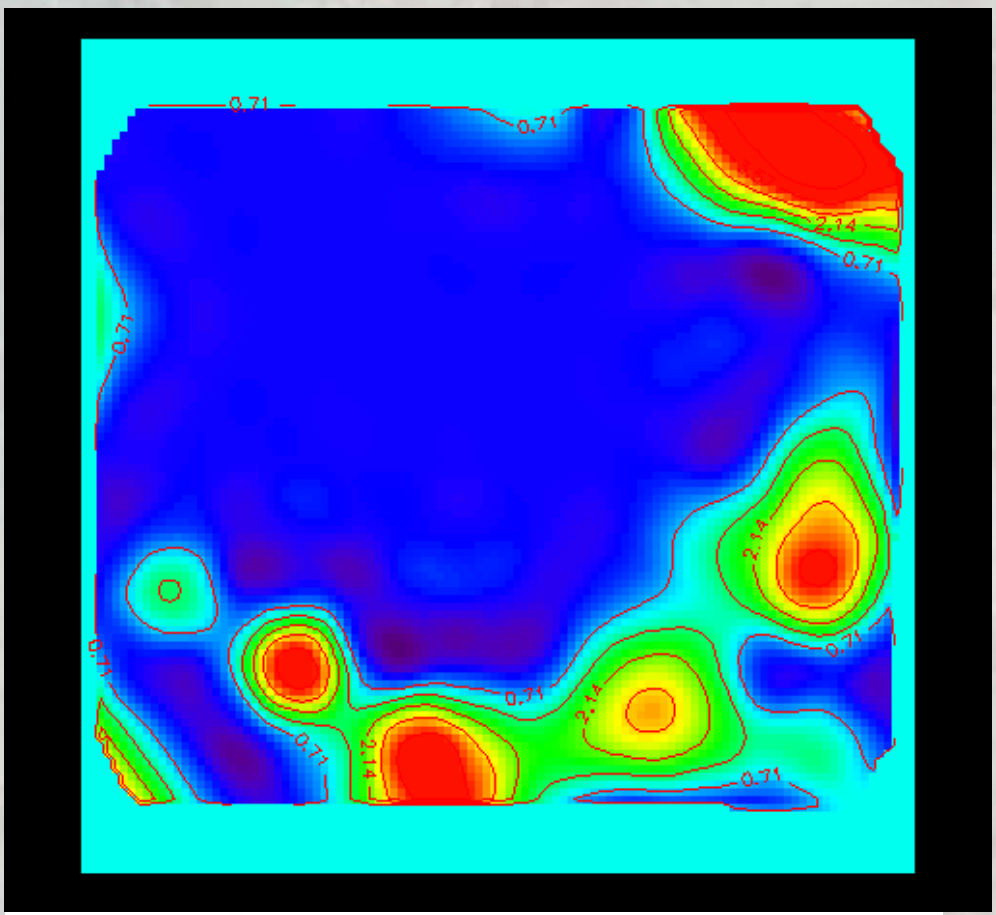
Radial velocity



Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

Extinction



Estimated from Hα/Hβ for S/N ratios of the quotient higher than 5.

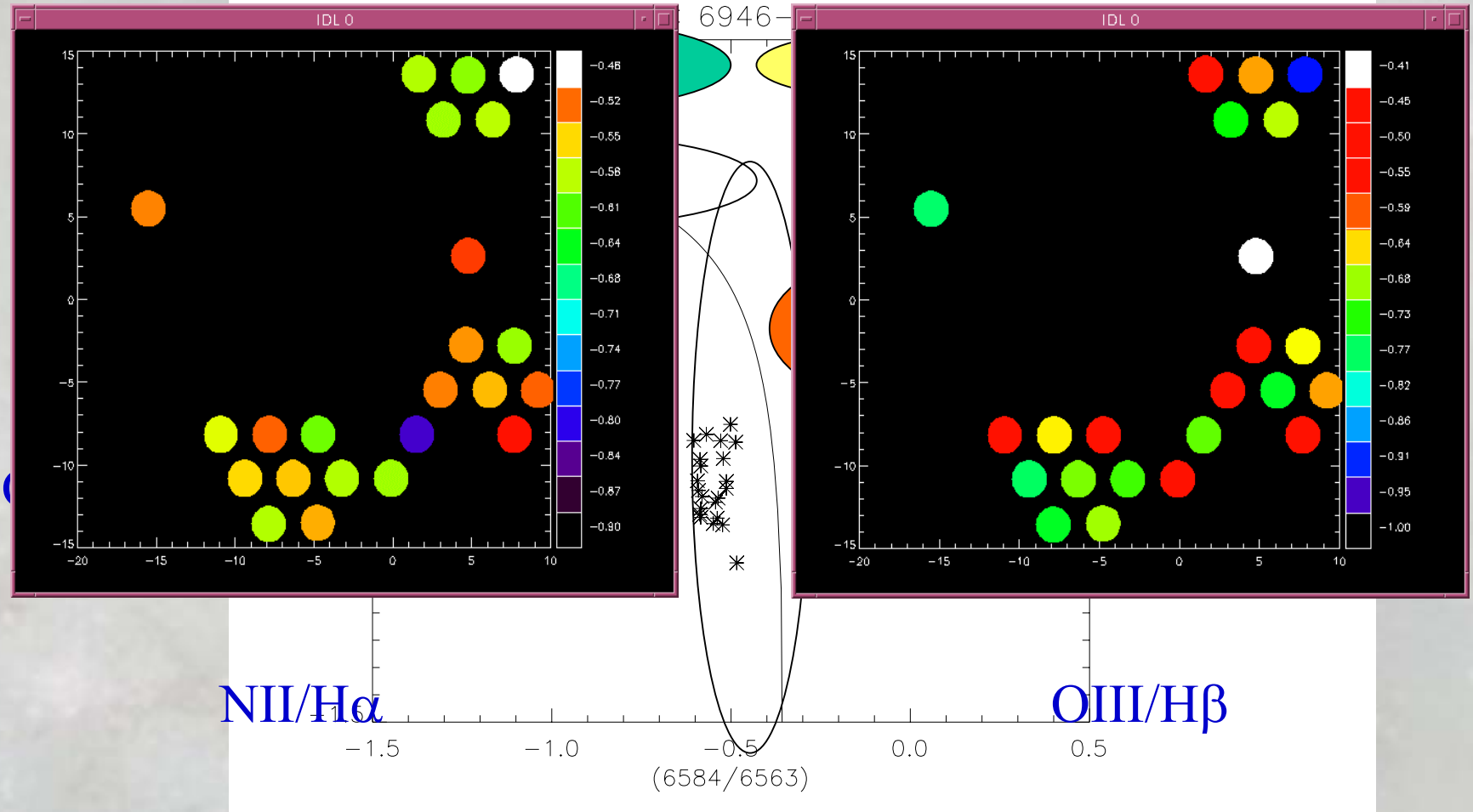
The quotient has been transformed into A_B magnitudes.

A_B between 1.5 and 4

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

Ionization structure



Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

NII/Hα

Summary

- The external ring of ionized gas shows a radial velocity field compatible with a pure rotation model for the host galaxy.

- A RV gradient is observed in the vicinity of the massive cluster.

- The extinction estimated from the emission lines of the gas is in good agreement with that derived from the stellar population.

- For those locations where a reliable OIII/Hβ ratio has been obtained, the emission lines seem to be originated by photoionization.

- No clear signs of shocks have been detected in this preliminary analysis.

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

The Future (I)

- 3D Structure & Star Formation
  - Corrugations of the Velocity Field
  - Meandering
    - Observational Confirmation
    - Models
- IMF from Fractal Clouds
- Tidal Streams

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004

The Future (II)

Two surveys aimed to analyze:

- The star formation history in the Universe (OTELO= OSIRIS+GTC)
- Cosmic evolution (ALHAMBRA=23 filters) + 3.5 m in Calar Alto
- OSIRIS:Probably, the most perfect machine for Star Formation Studies

OSIRIS (Probably, the most perfect Machine for Star Formation Studies)

Science with Tunable Filters

(Bland-Hawthorn, 2003; in Science with the GTC 10m telescope)

- Starburst Galaxies
- Disk-Halo Connection in Spirals
- Star Formation in elliptical and spiral Galaxies
- Stellar Populations in Galaxies

Mercedes Prieto (IAC)
Emilio J. Alfaro (IAA-CSIC)

Estallidos III
La Laguna, December 2004