

Blue Compact Galaxies and Dwarf Starburst Galaxies at $z=0$ and 2

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Opportunities with the 3D-NTT:

H α kinematics of local objects (other lines)

Deep emission line images of starbursts

Ly α emitters at $z=0$ and 2

3D-NTT scientific meeting

3D-NTT Scientific council, Meudon, April 2, 2008

Blue Compact Galaxies

- *Gaseous and stellar kinematics*

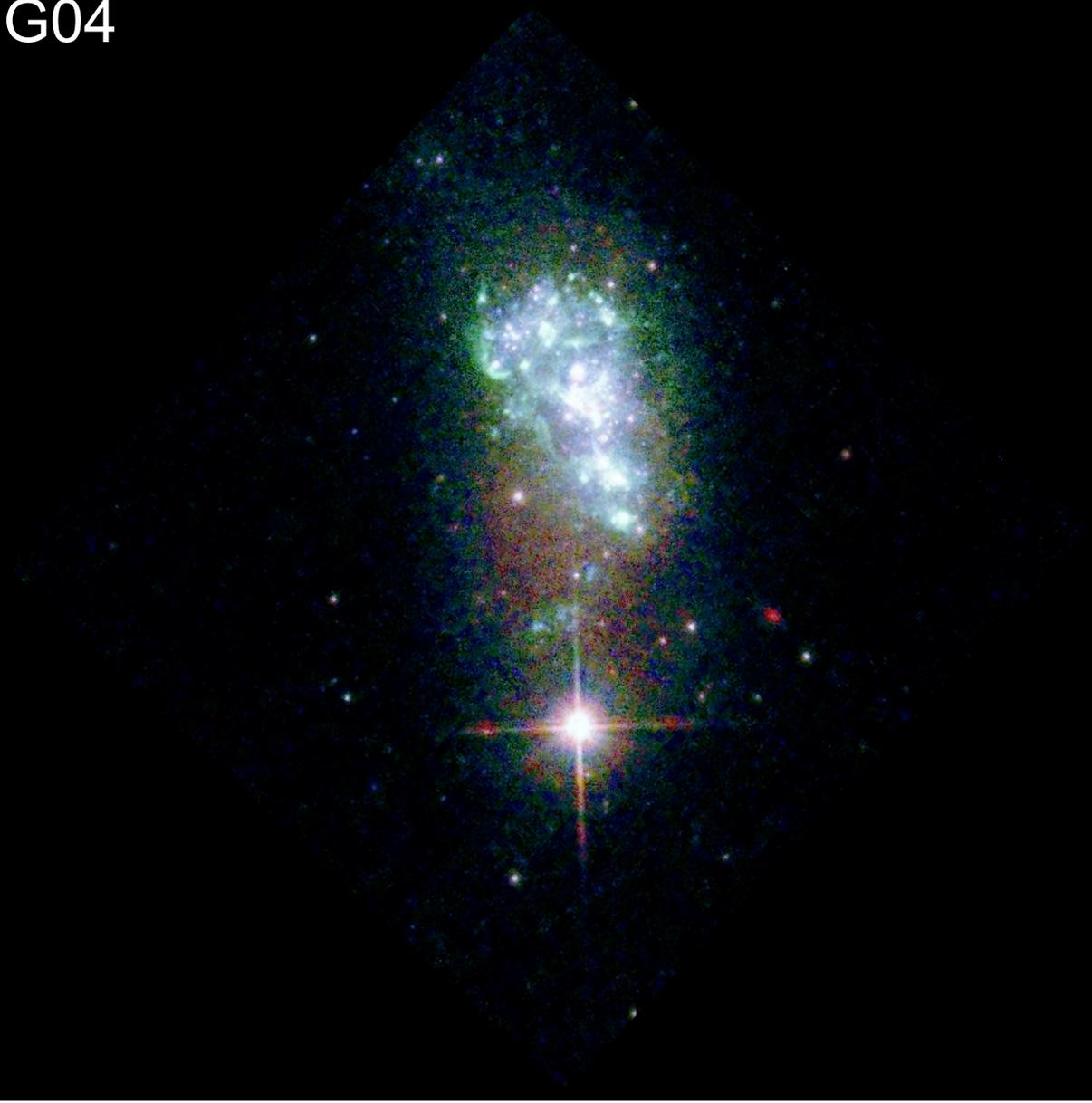
Collaborators:

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Nils Bergvall, Uppsala
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Kambiz Fathi, Stockholm
Robert Cumming, Stockholm
Philippe Amram, Marseille
Jaques Boulesteix, Marseille
Josefa Masegosa, Granada
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Et al.

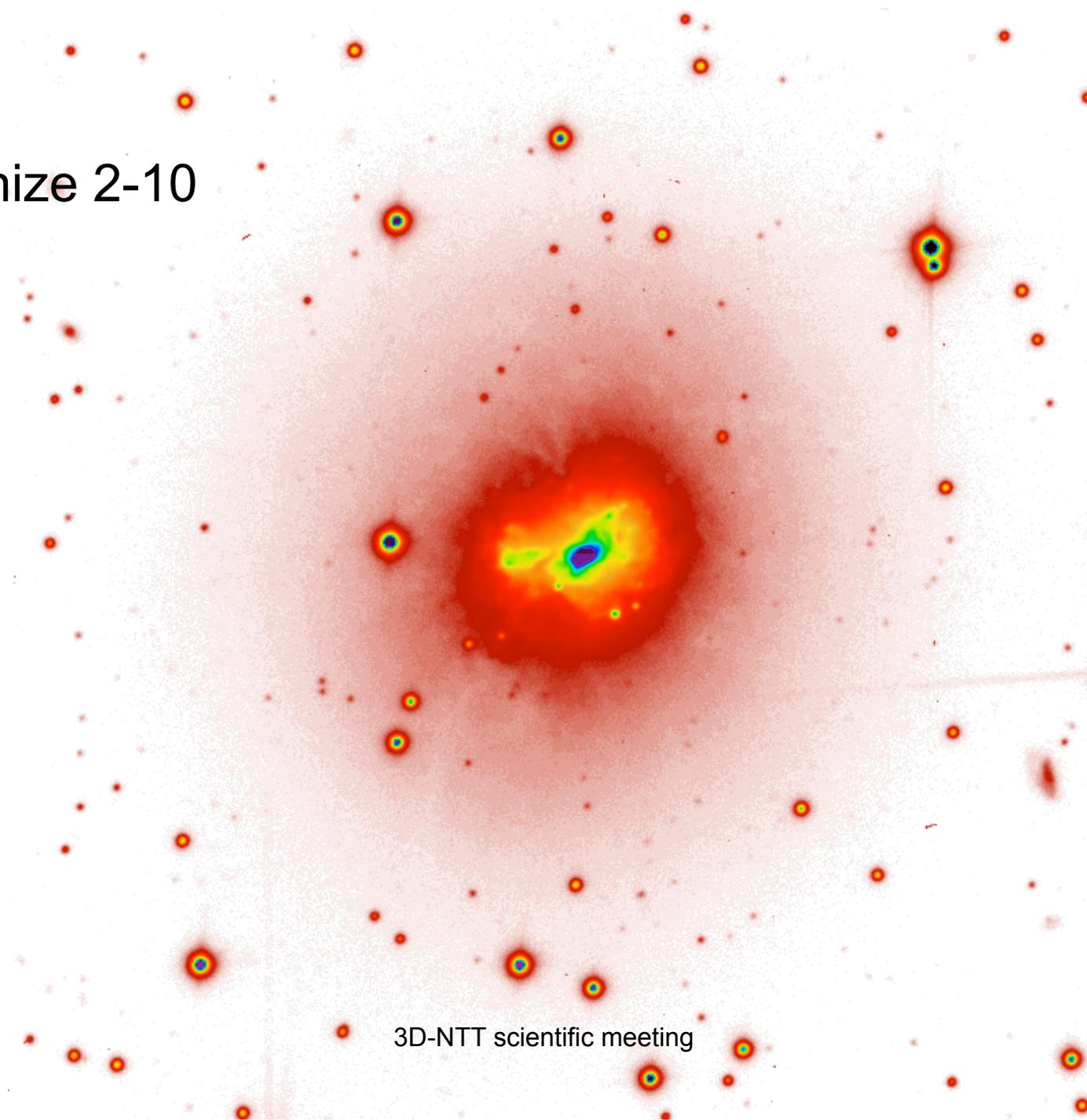
Outline

- Blue Compact Galaxies
- Observations with CIGALE
- Gas vs. stellar kinematics (FORS2 & FLAMES)
- PSF-wings of the IPCS (**L3CCD?**)
- Lyman alpha at $z=0$ and 2

ESO 338-IG04



Henize 2-10



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Blue Compact Galaxies share several properties with high-z galaxies (and LBCGs become common):

They form a lot of stars right now.

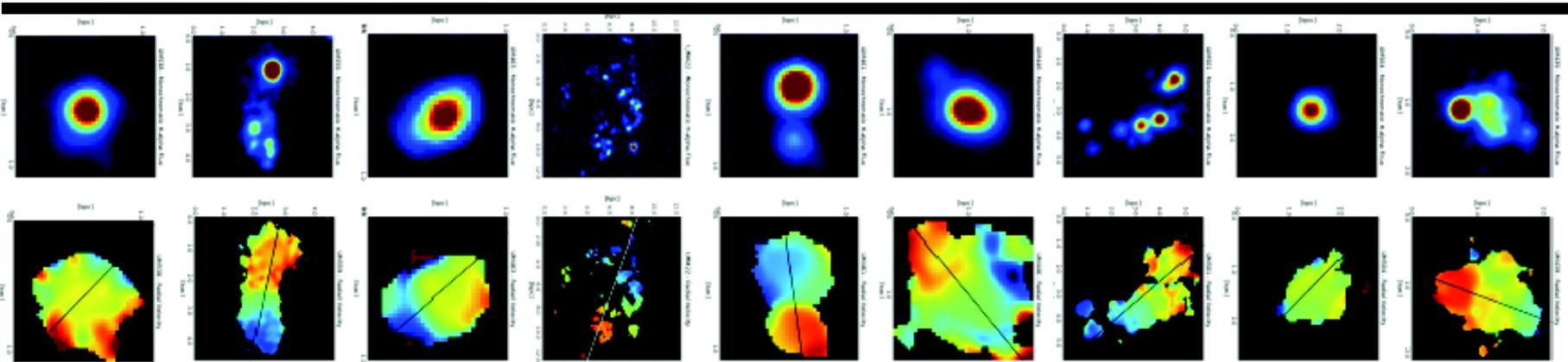
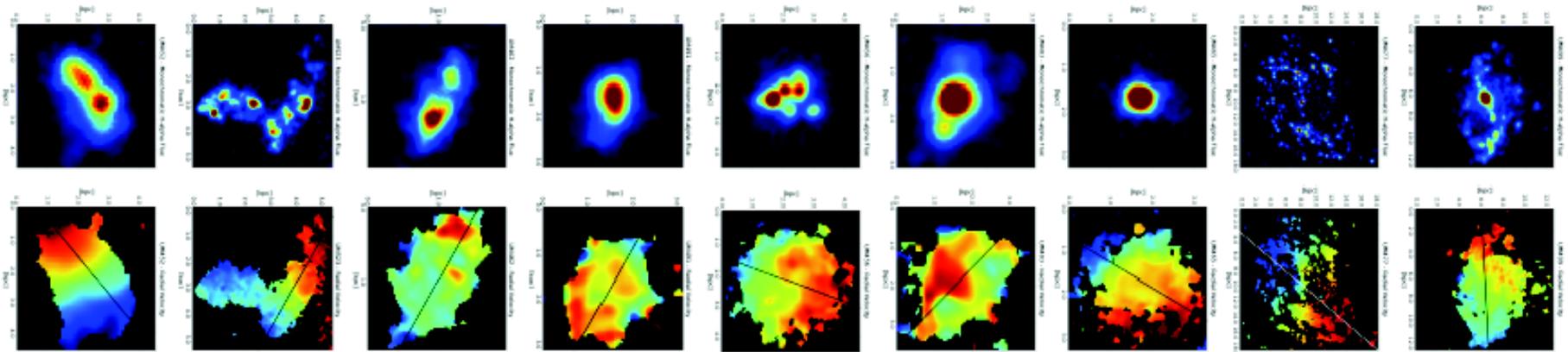
Why?

Trigger? Mergers?

Precursors?

Outcome?

BCGs with CIGALE at the ESO 3.6m: two samples of ~20 BCGs each



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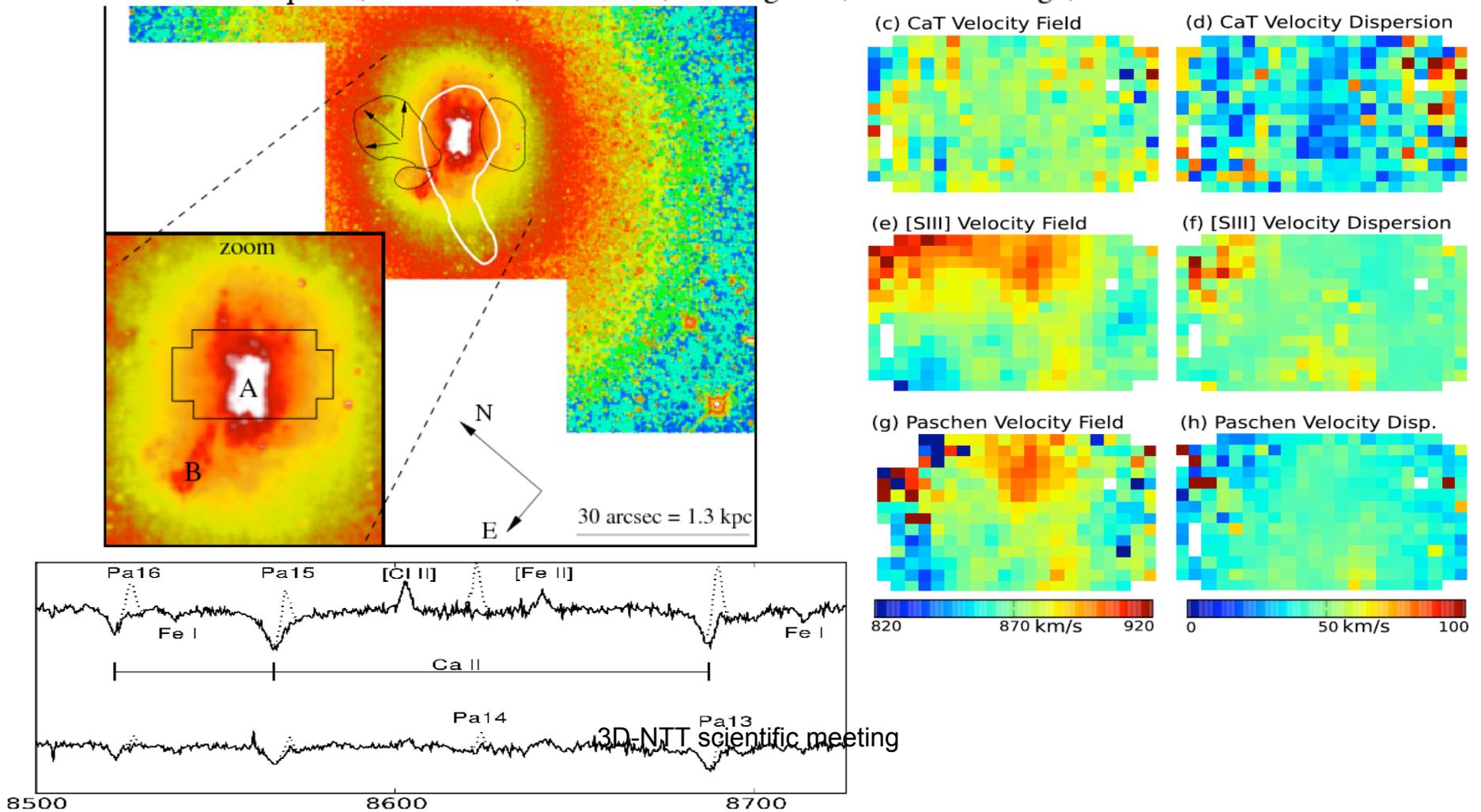
Do Gas and Stars agree?

- Gas follows stars, “strange” motions → true dynamical disturbance, merger
- Gas decoupled from stars → feedback!
- Velocity dispersion dominates → transition to early-type object

Star-gas decoupling and a non-rotating stellar core in He 2-10

Integral field spectroscopy with FLAMES/ARGUS★

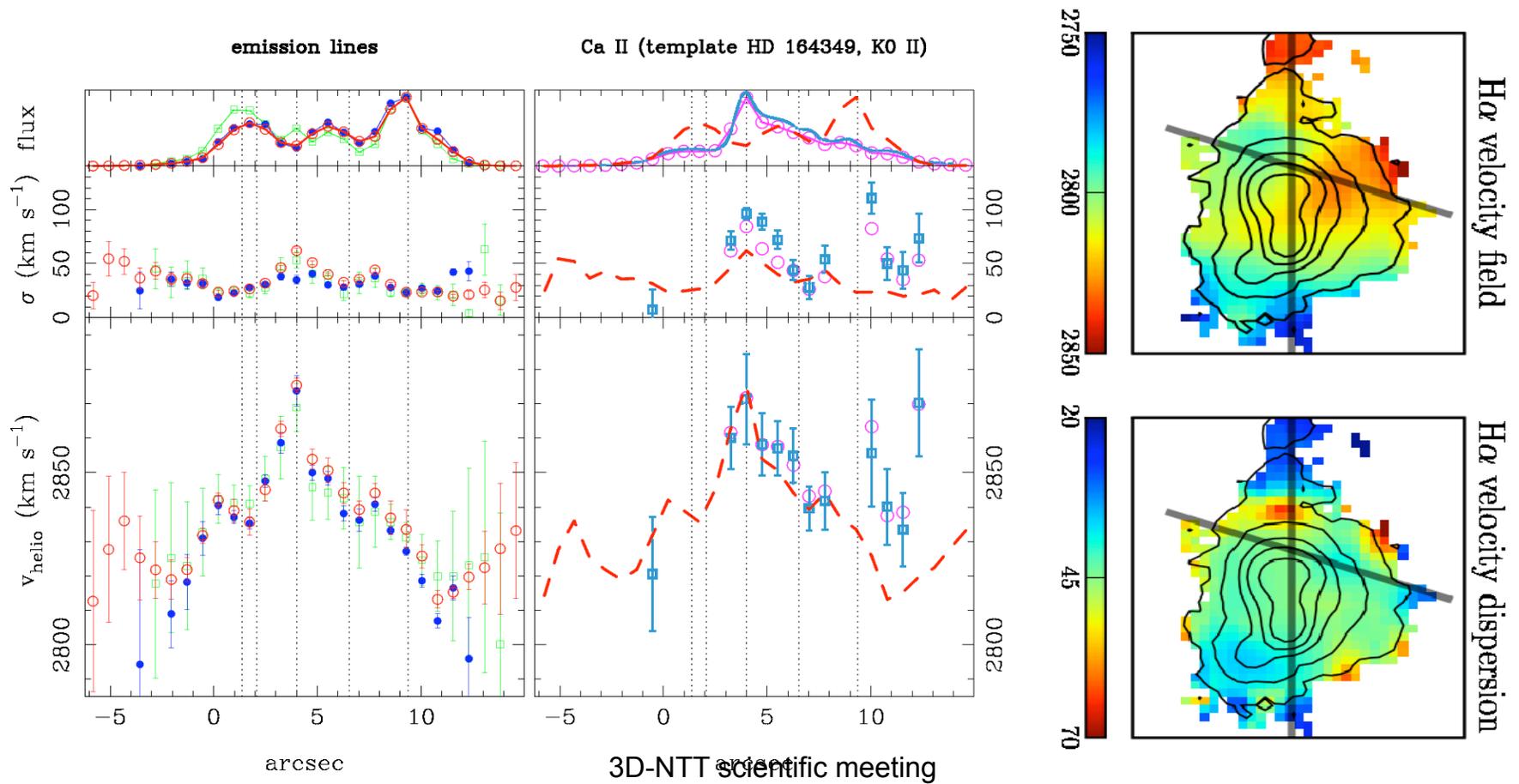
T. Marquart¹, K. Fathi^{2,3}, G. Östlin³, N. Bergvall¹, R. J. Cumming³, and P. Amram⁴



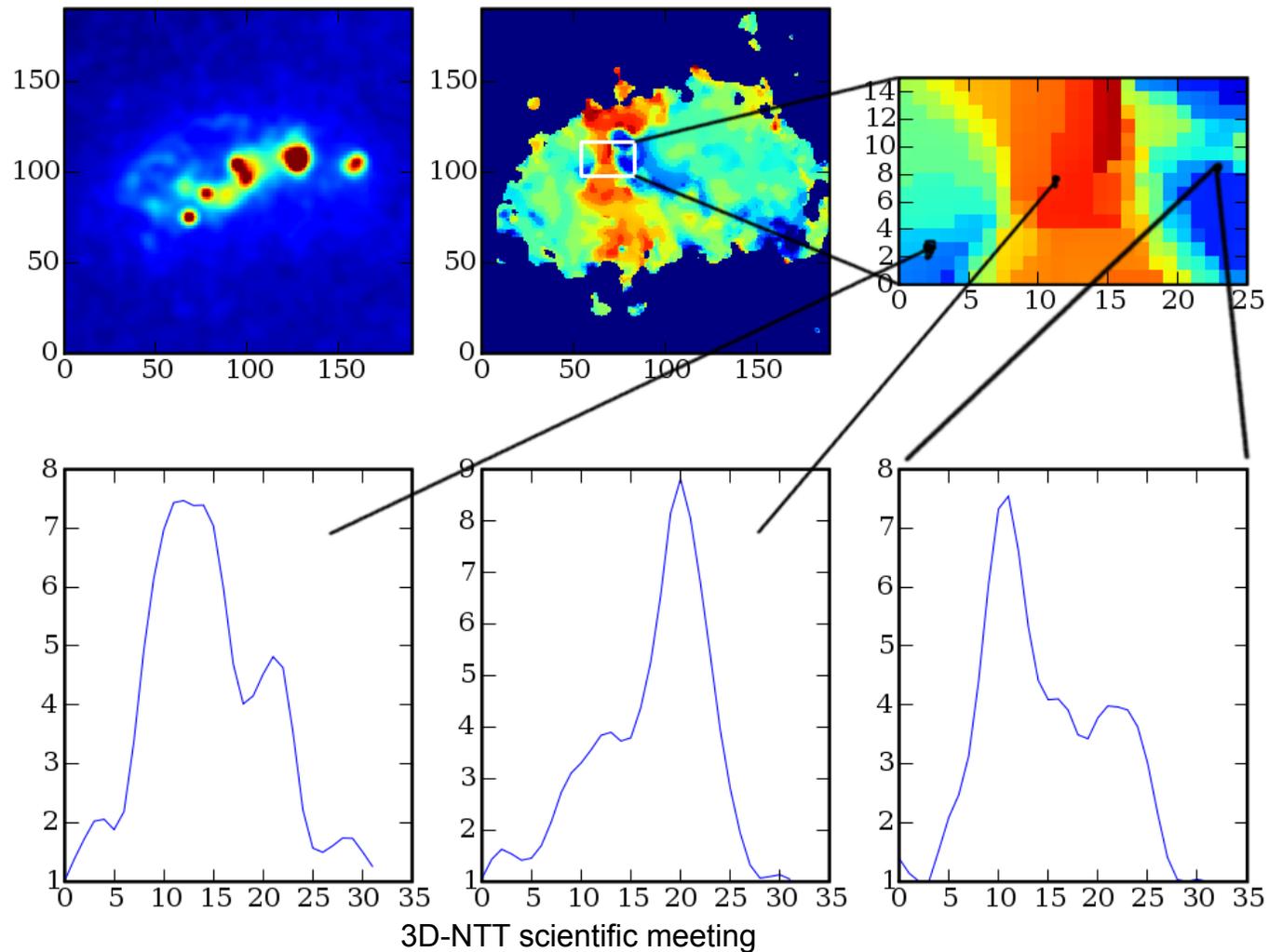
Stellar dynamics of blue compact galaxies

II. Further indications of a merger in ESO 338-IG04[★]

Robert J. Cumming¹, Kambiz Fathi^{1,2}, Göran Östlin¹, Thomas Marquart³, Isabel Márquez⁴, Josefa Masegosa⁴, Nils Bergvall³, and Philippe Amram⁵



ESO 421-12 / High res needed to avoid confusion

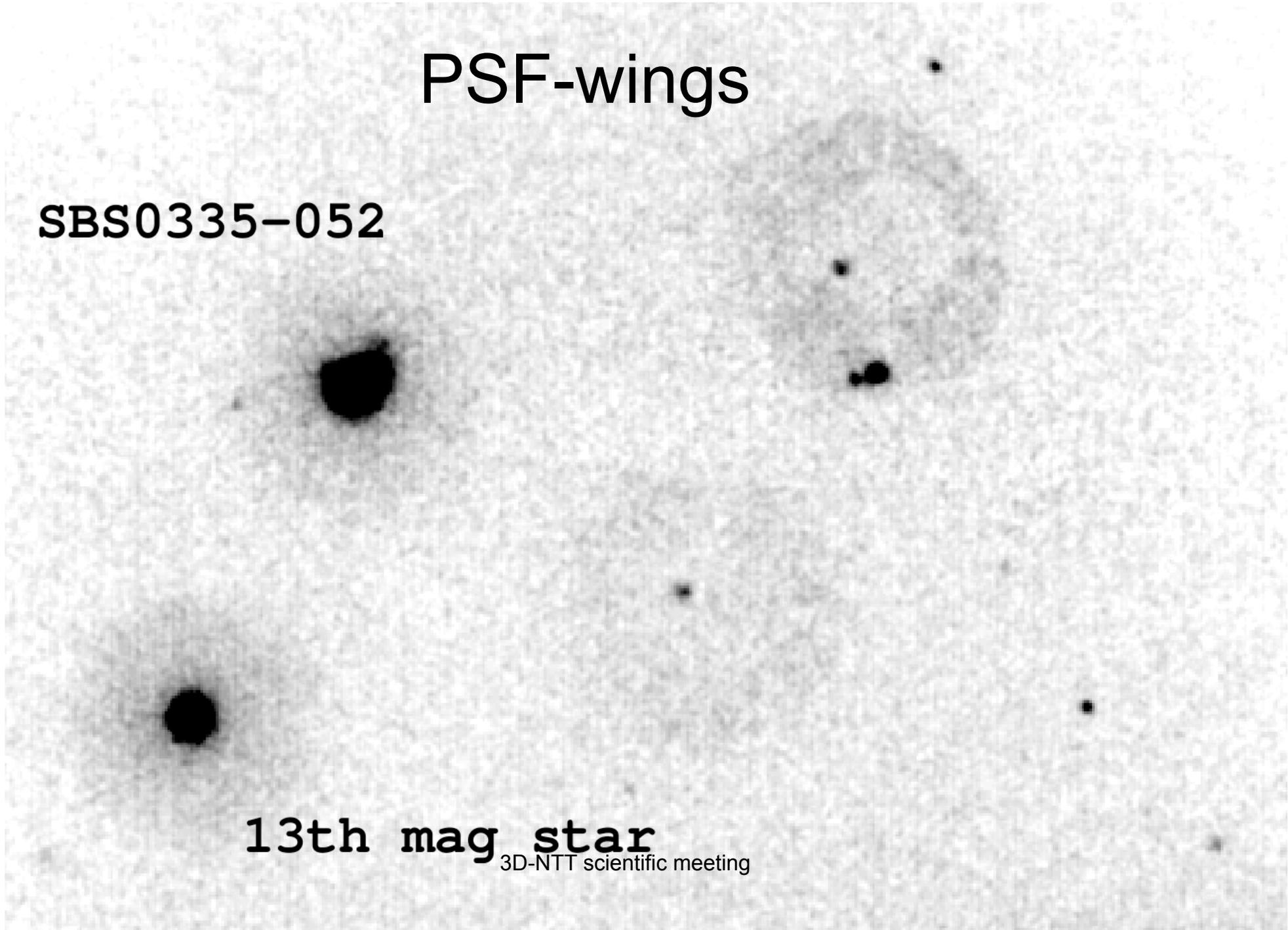


PSF-wings

SBS0335-052

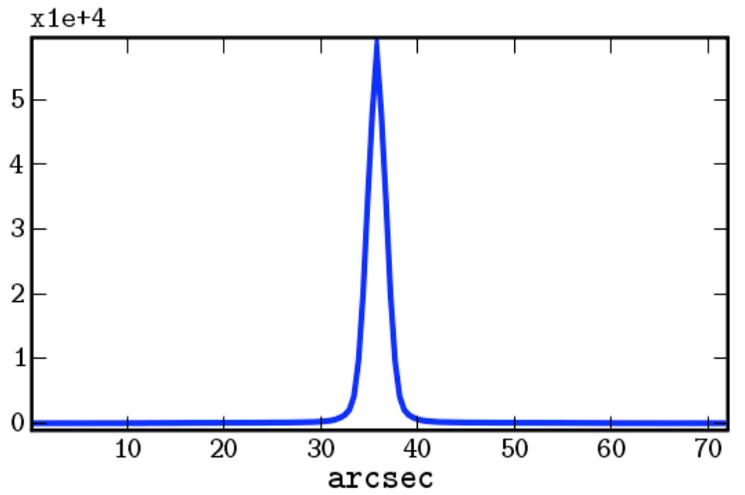
13th mag star

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PSF-wings

SBS0335-052

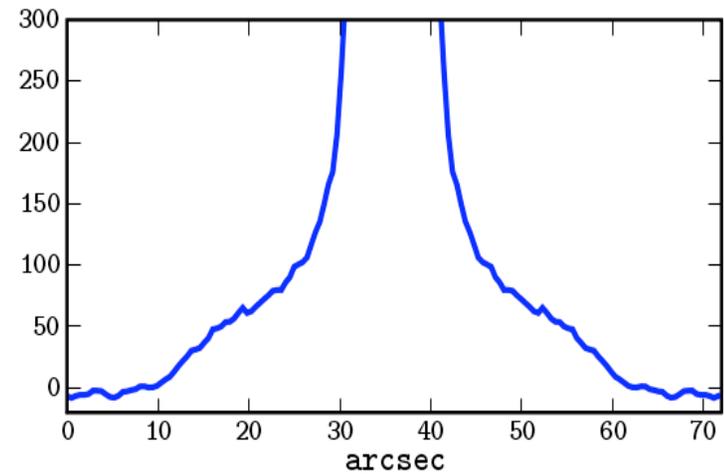
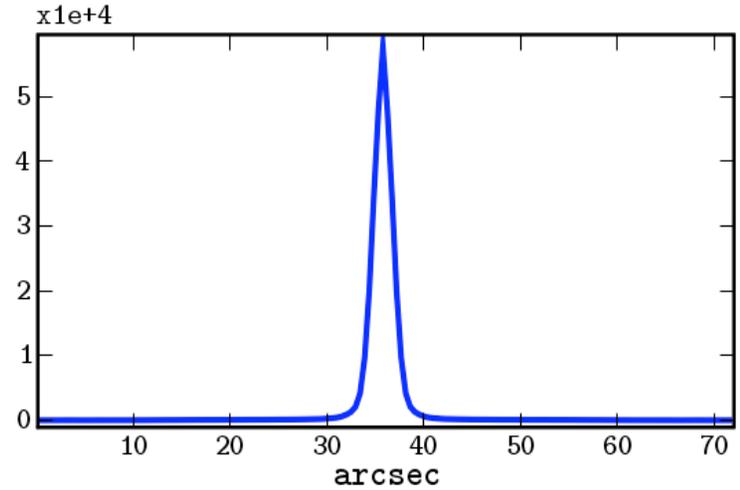


13th mag star

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PSF-wings

SBS0335-052

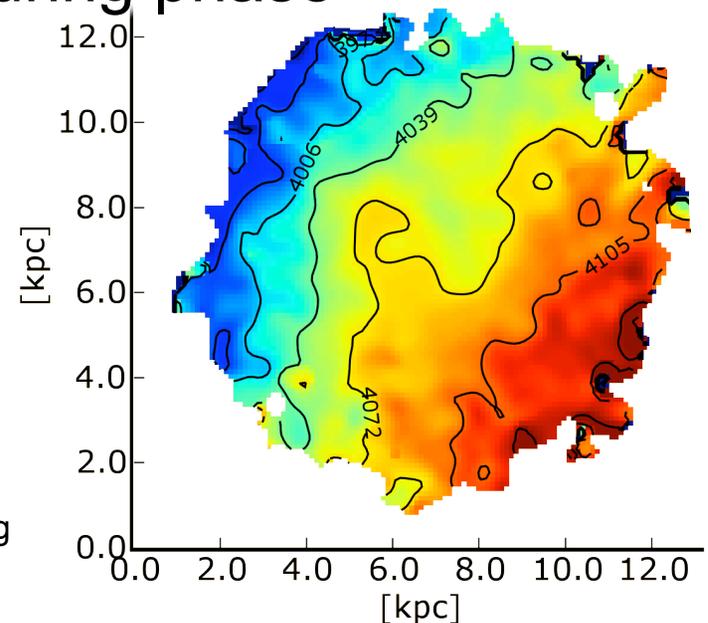


13th mag star

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PSF-wings cont.

- It's a matter of contrast.
- These wings arise **after** the etalon!
 - no spatial variation in each channel.
 - introduce a velocity gradient during phase correction.
 - technical reason?



BCGs with 3D-NTT

- Use SDSS (possibly GALEX) to define homogeneous sample of starburst BCGs and postbursts (what will become of them?)

-> find the missing link

FP with $R=10\ 000$ appropriate (+ TF imaging?)

PSF effects?

Absorption lines? CaT, NaD (Ly α)

Other emission lines

Lyman-alpha emission

- Strongest recombination line, up to 30% of LyC
- Accessible at $z=2$ to 6.5 in optical from ground, up to $z=20$ in the near IR

H-alpha shifted out of near IR at $z=2.5$

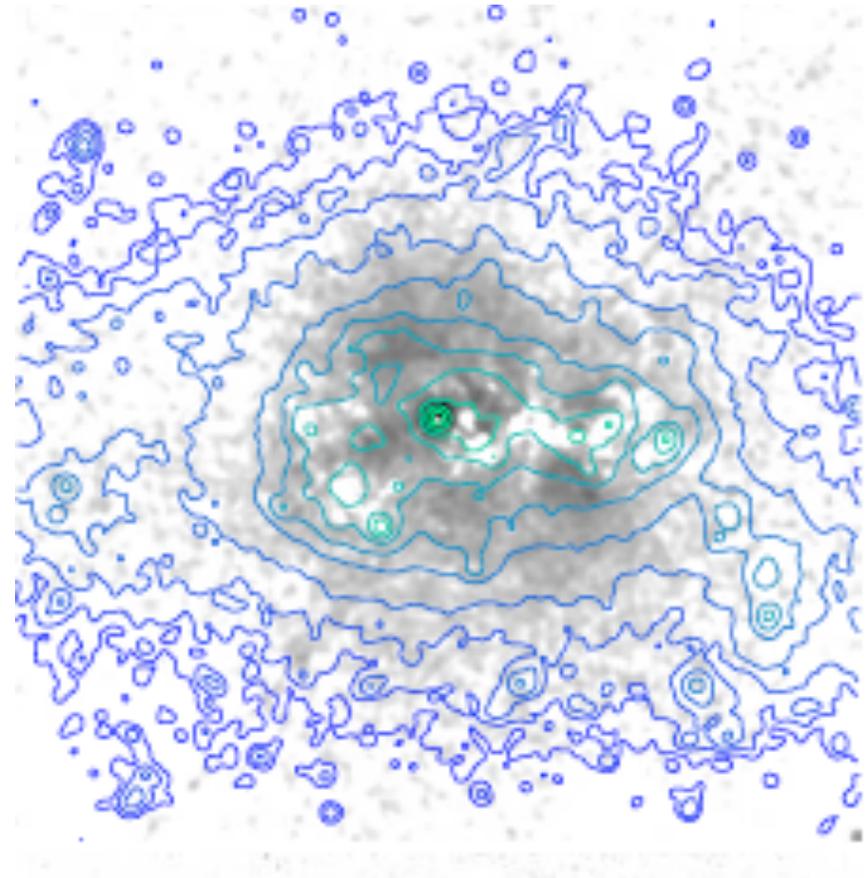
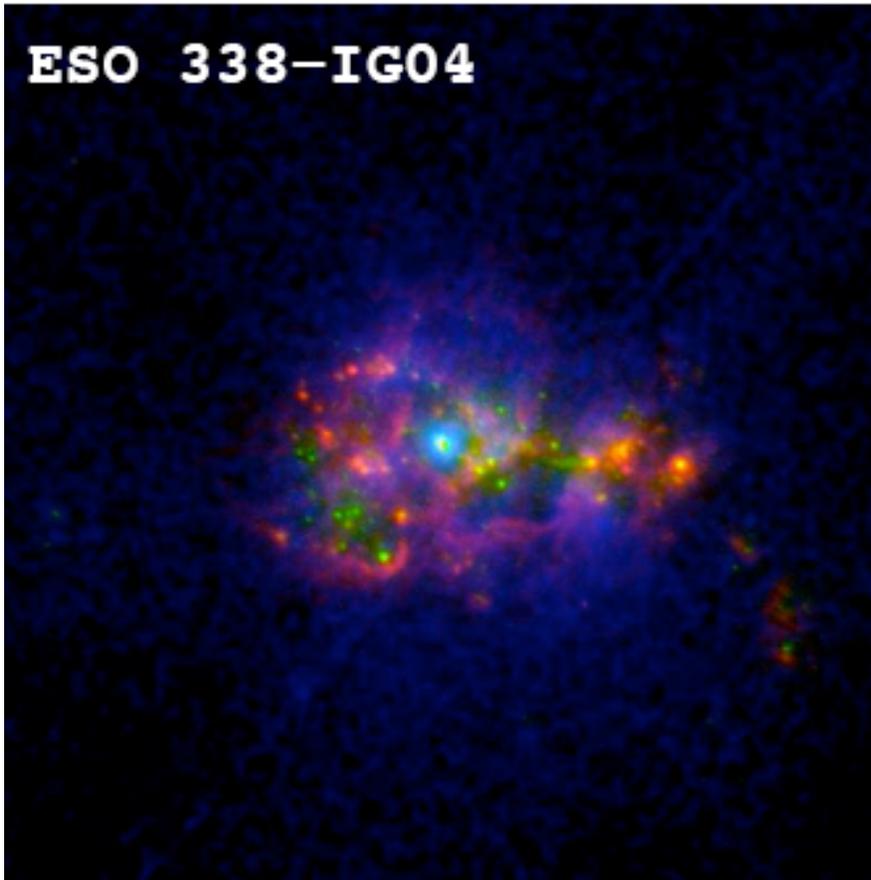
- Resonant line: dust and HI velocity field
- Emission lines can probe fainter than LBG
- Reionisation

- *Interpretation far from straight forward*

- *Hayes, Kunth, Mas-Hesse, Schaerer, Leitherer, Atek et al.*

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Local luminous blue compact galaxy at $z=0.01$ observed with HST



20" x 20"

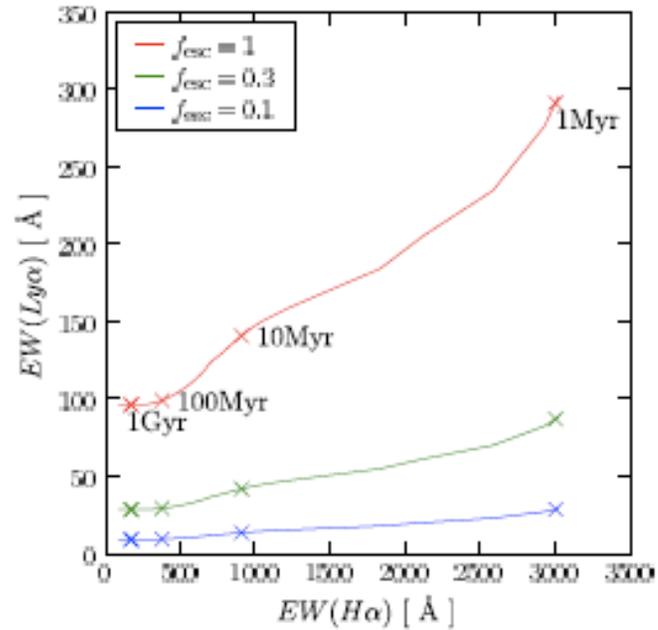
Red: H-alpha

Green: 1500Å continuum

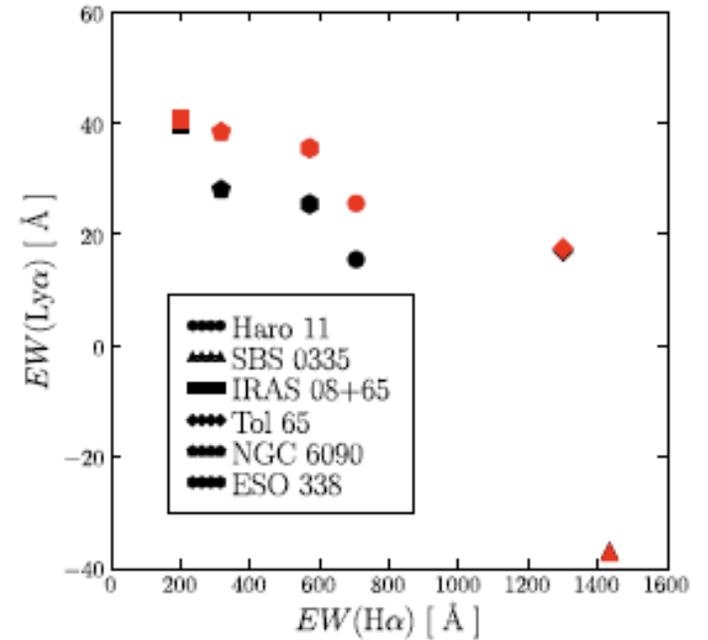
Blue: Lyman-alpha

3D-NTT could be used to study porosity:
[OII]3727, [OIII]5007, H-beta
TF or FP

Model



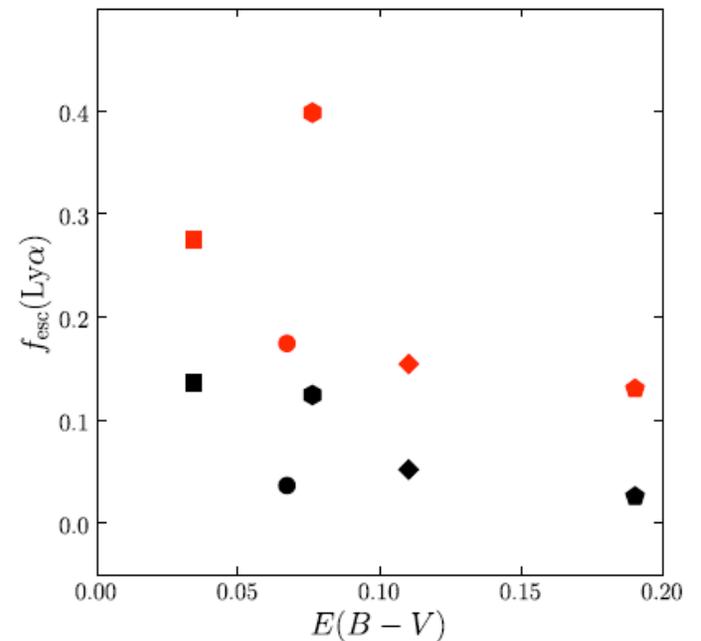
Observed local/HST



Equivalent width of Ly α and H α should be positively correlated but are not!

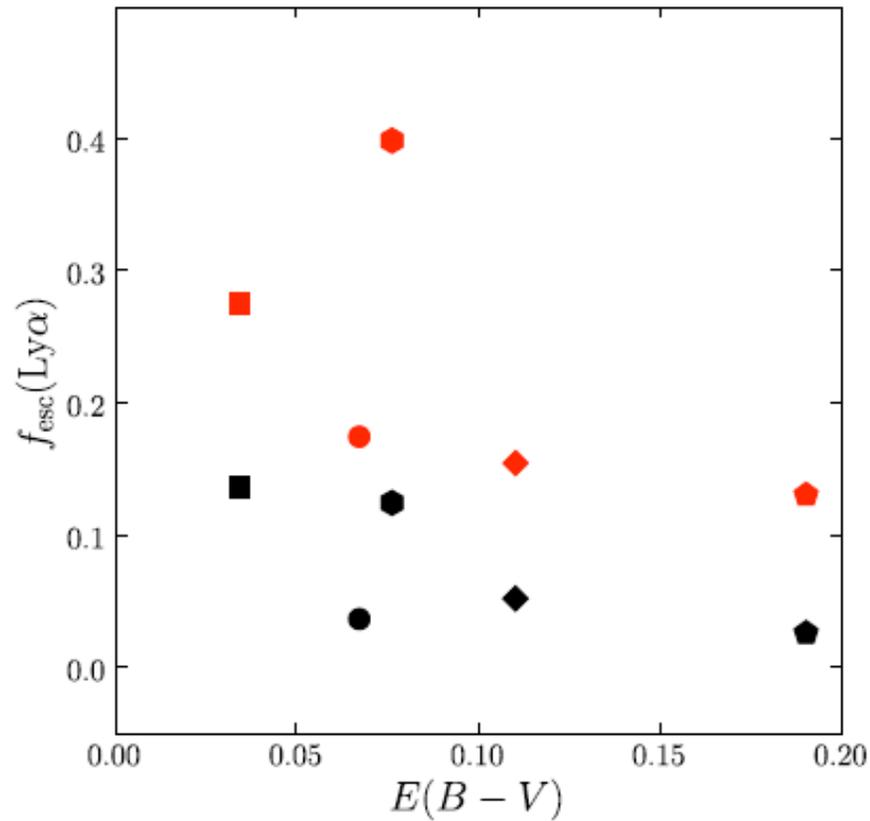
- ◆ Observed
- ◆ Corrected for internal extinction

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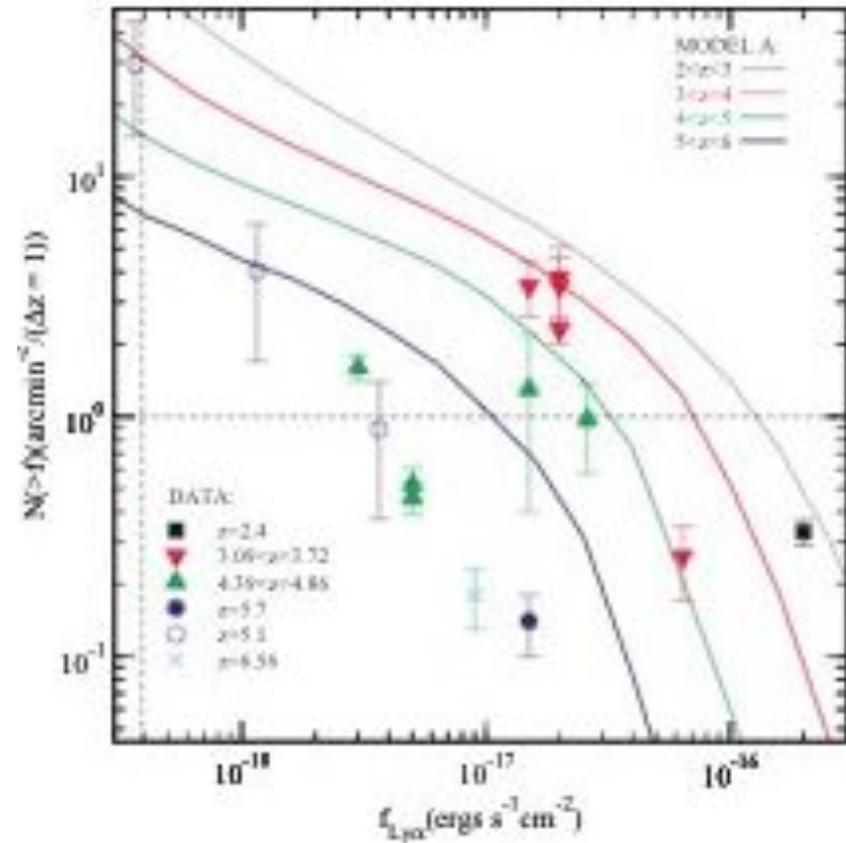


- For LBGs at $z=3$, median $\text{EW}(\text{Ly}\alpha)=0 \text{ \AA}$
- Semianalytic models can match data if $f_{\text{esc}}=2\%$ f
- Dust only part of the story

Local observations



SA model



Lyman alpha at $z=2$ with 3D-NTT

- Tunable filter with $R \approx 200$: contsub & z 's
- For $z=2.2$ both $H\alpha$ and $Ly\alpha$ accesible from ground **SFR**
- Utilising Legacy data for cont-sub and SED fitting
- FOV $17' \times 17'$ is 4 **HAWKi** pointings ($H\alpha$) ($8 \times 8 = 1$)
- Probing SFR 1.6 Msun/yr takes 2 per pointing with HAWKi in $H\alpha$
- To reach same depth with **FORS1** and cloned filter to $Ly\alpha$ takes as long for $f_{esc} = 10\%$
- *3D-NTT can compete: FOV, contsub, z , T ?*