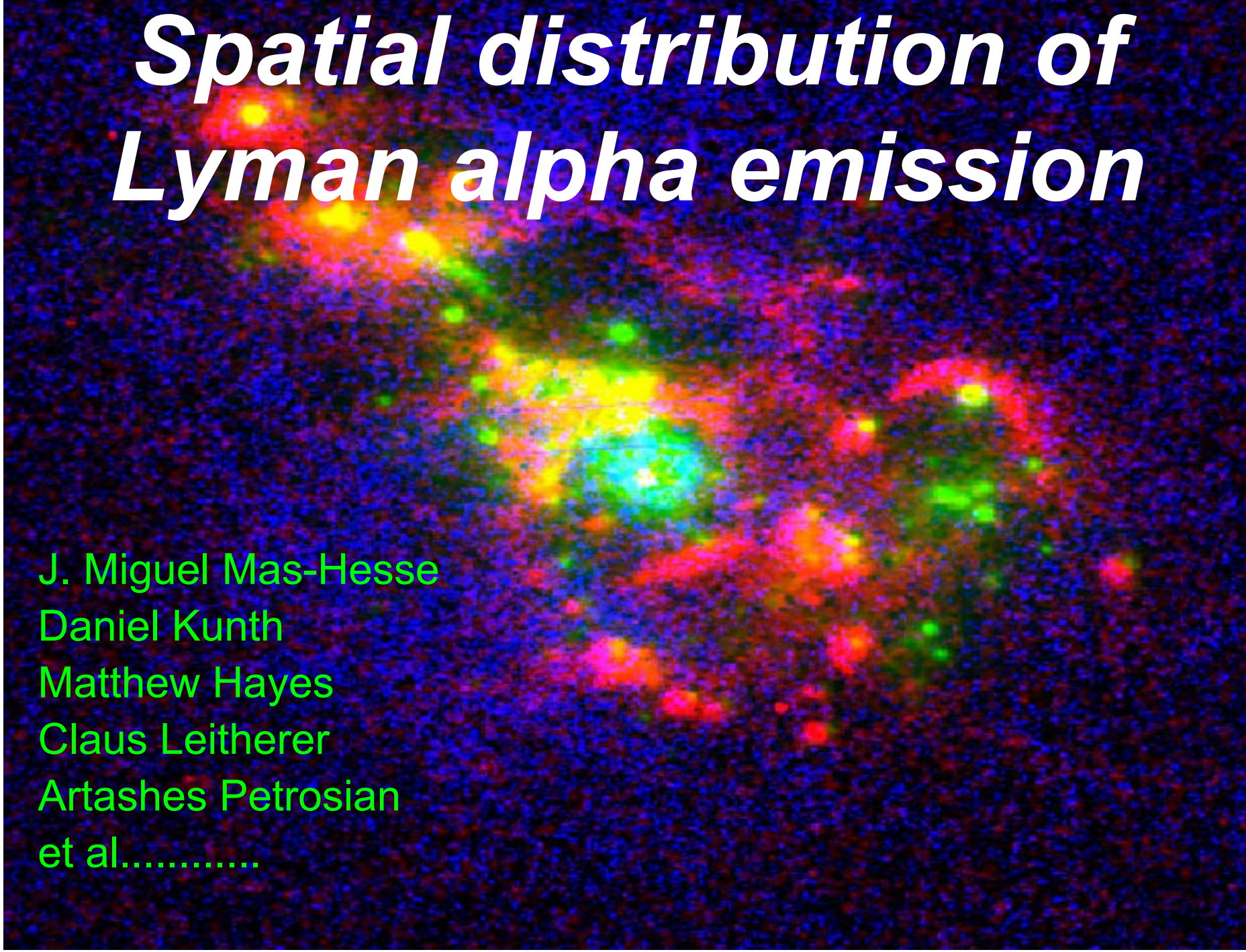
Spatial distribution of Lyman alpha emission

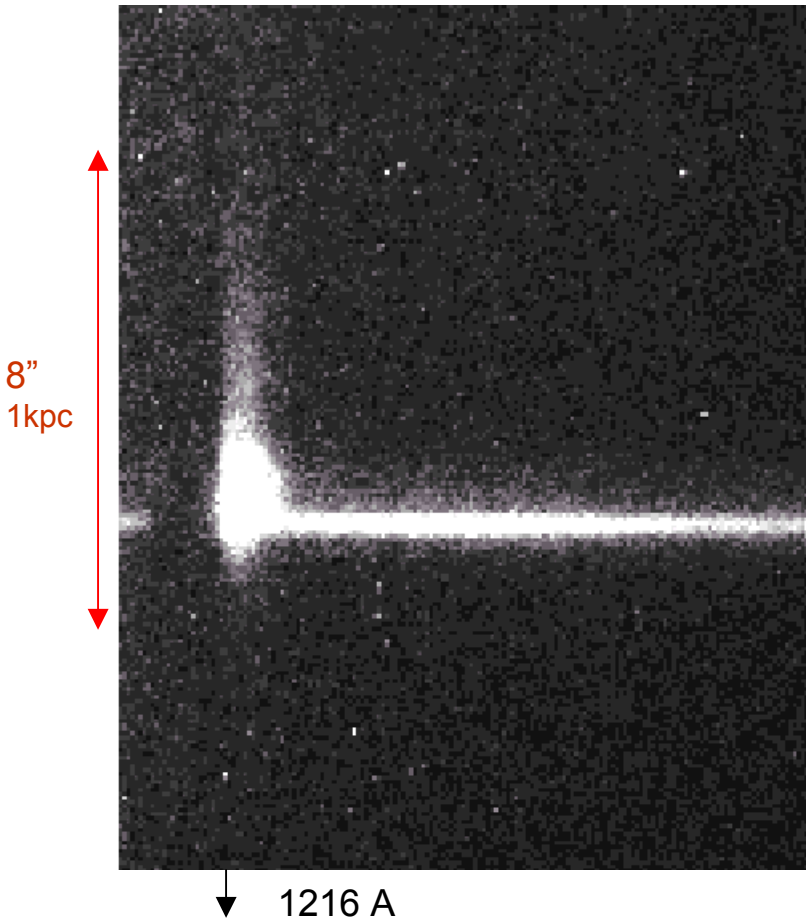


J. Miguel Mas-Hesse
Daniel Kunth
Matthew Hayes
Claus Leitherer
Artashes Petrosian
et al.....

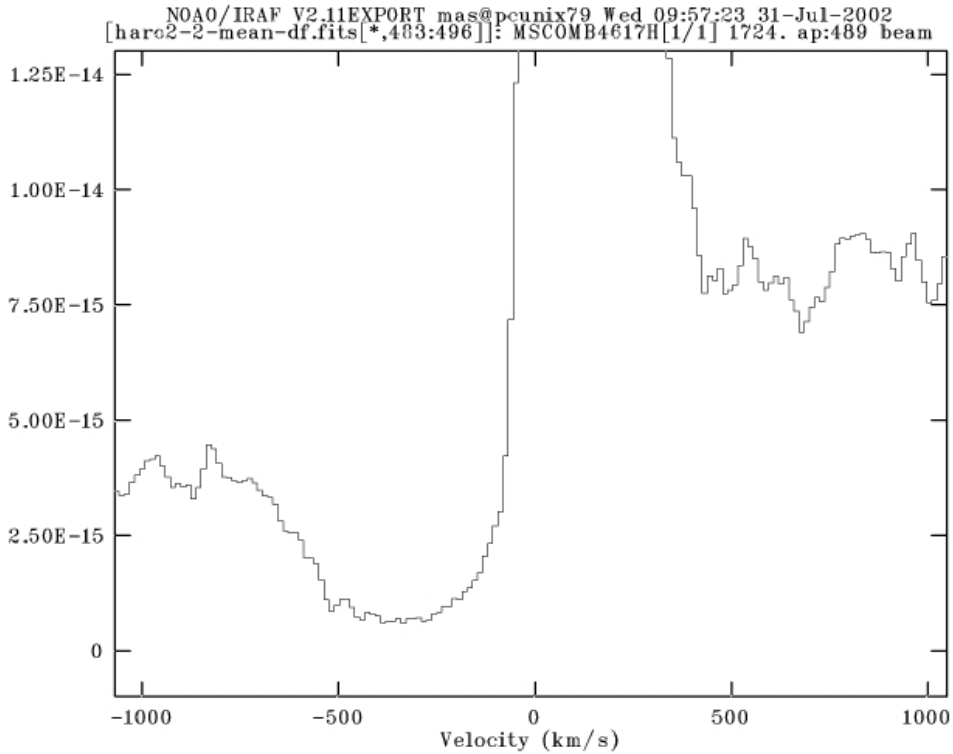
Lyman alpha emission in starbursts

- Lyman alpha should be the strongest emission lines in HII regions.
- But it is strongly affected by multiple scattering in the neutral HI gas.
- We know that the Lyman alpha emission line in starbursts shows often typical P Cyg profiles, tracers of outflowing neutral gas.

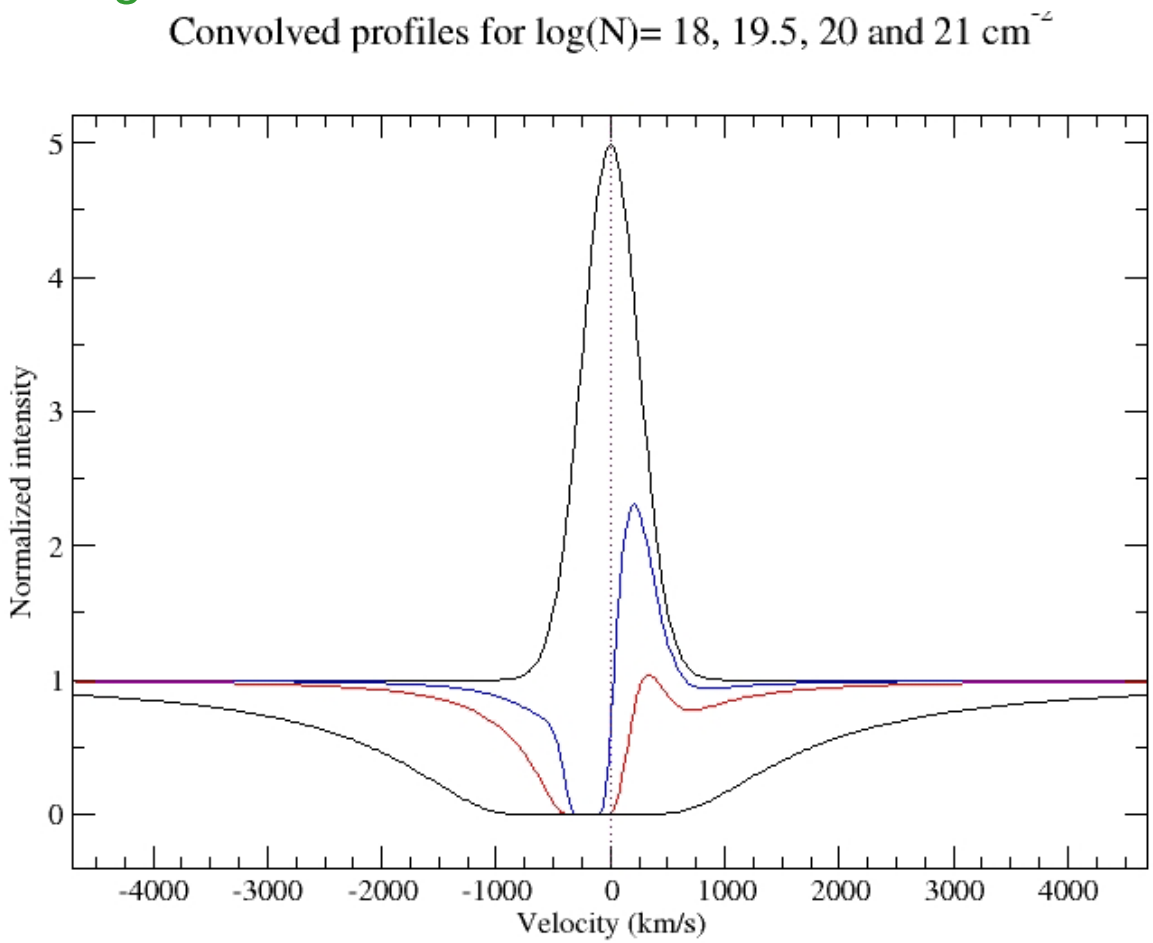
Haro 2



Lyman alpha P Cyg profiles



- These profiles are explained as the effect of outflowing neutral gas and allow to derive the kinematical properties of the neutral gas surrounding starbursts.

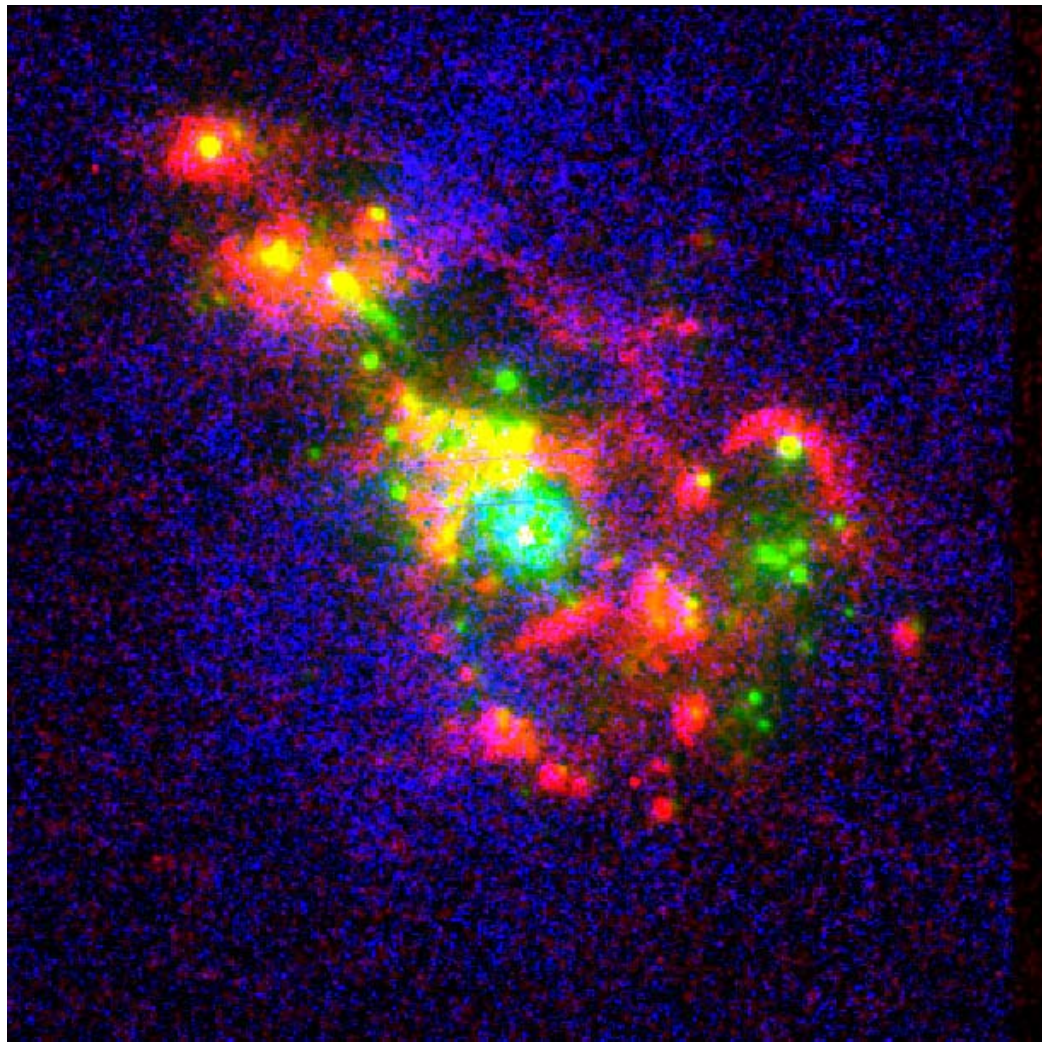


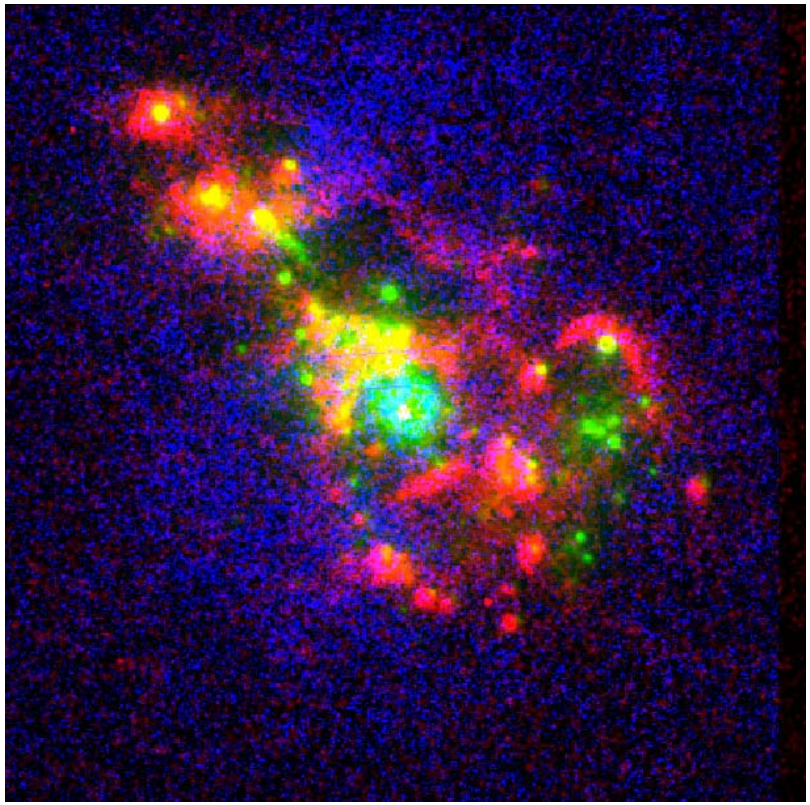
Lyman alpha ACS imaging

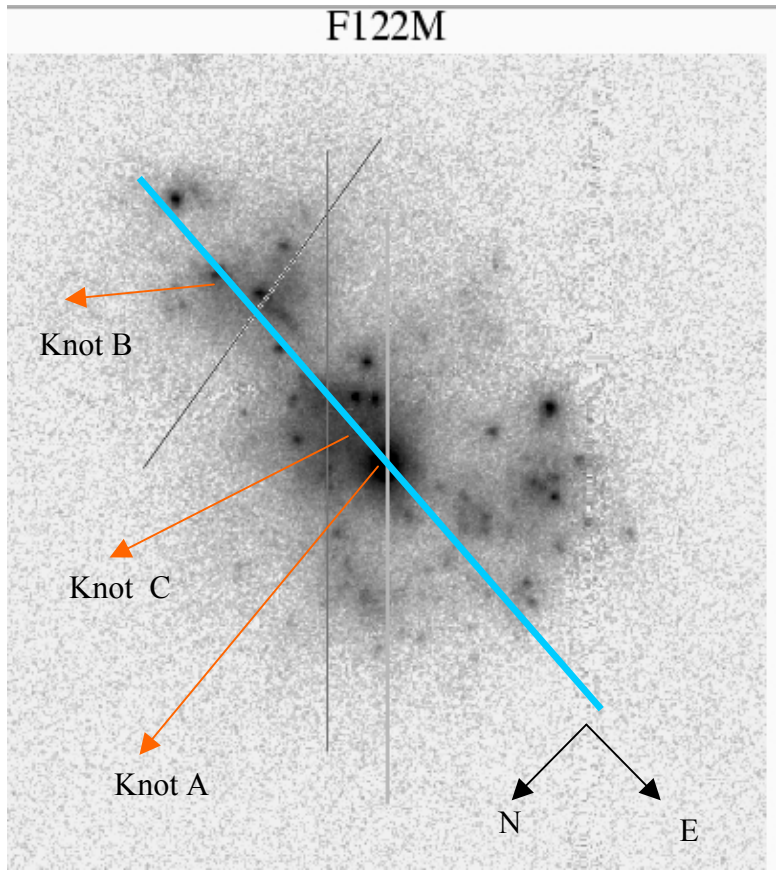
- We started 2 years ago a programme to obtain Lyman alpha images with HST-ACS, aiming to map the properties of the neutral gas by comparing the spatial distribution of Lyman alpha and H alpha emissions.
- We have got only now the first reliable results.
- *But it has not been easy at all. Things can be sometimes much more complicated than expected!*

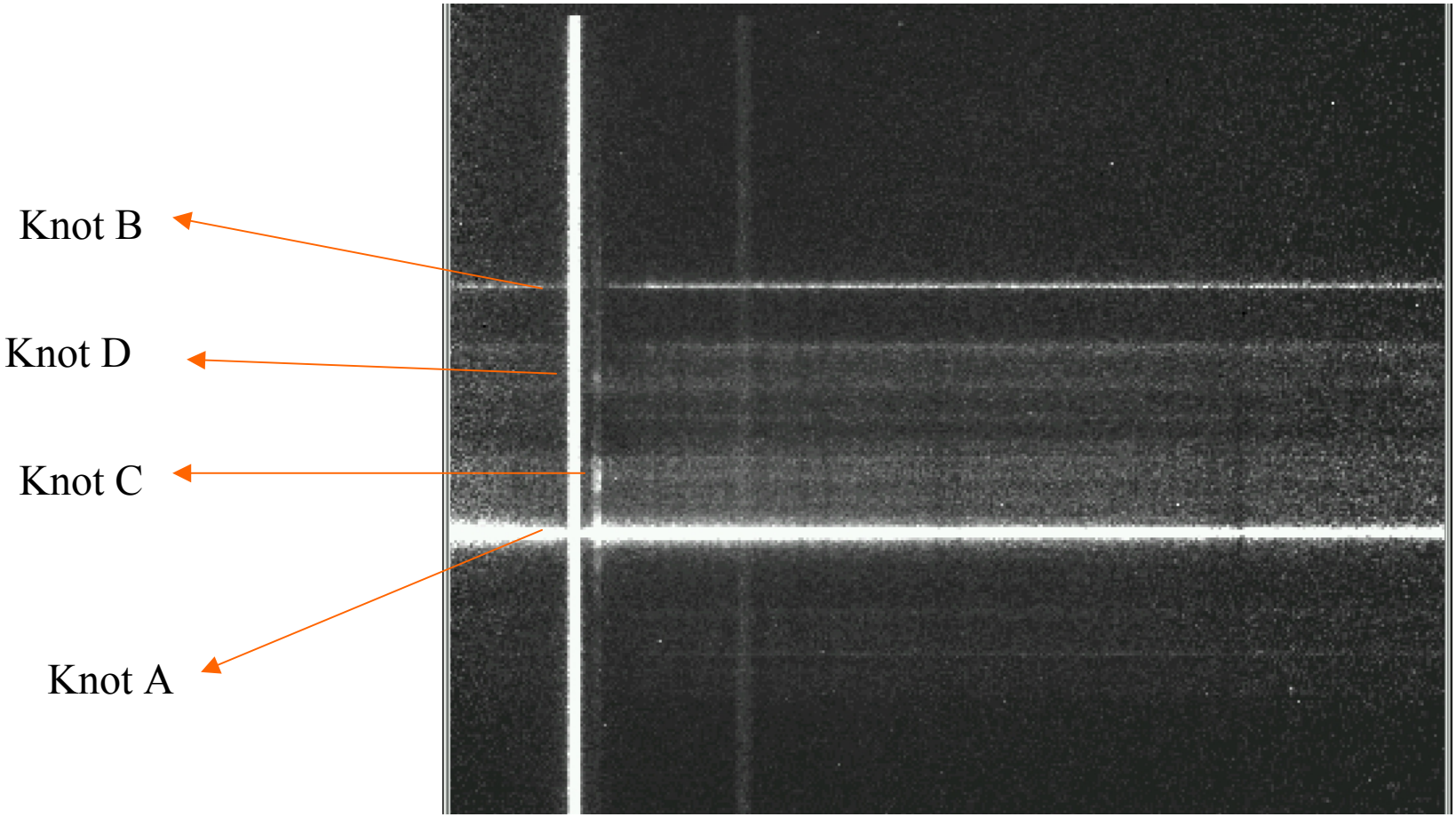
ESO 338-IG04 = Tol1924-416: a test case

Red: OIII
Green: UV continuum
Blue: Lyman alpha



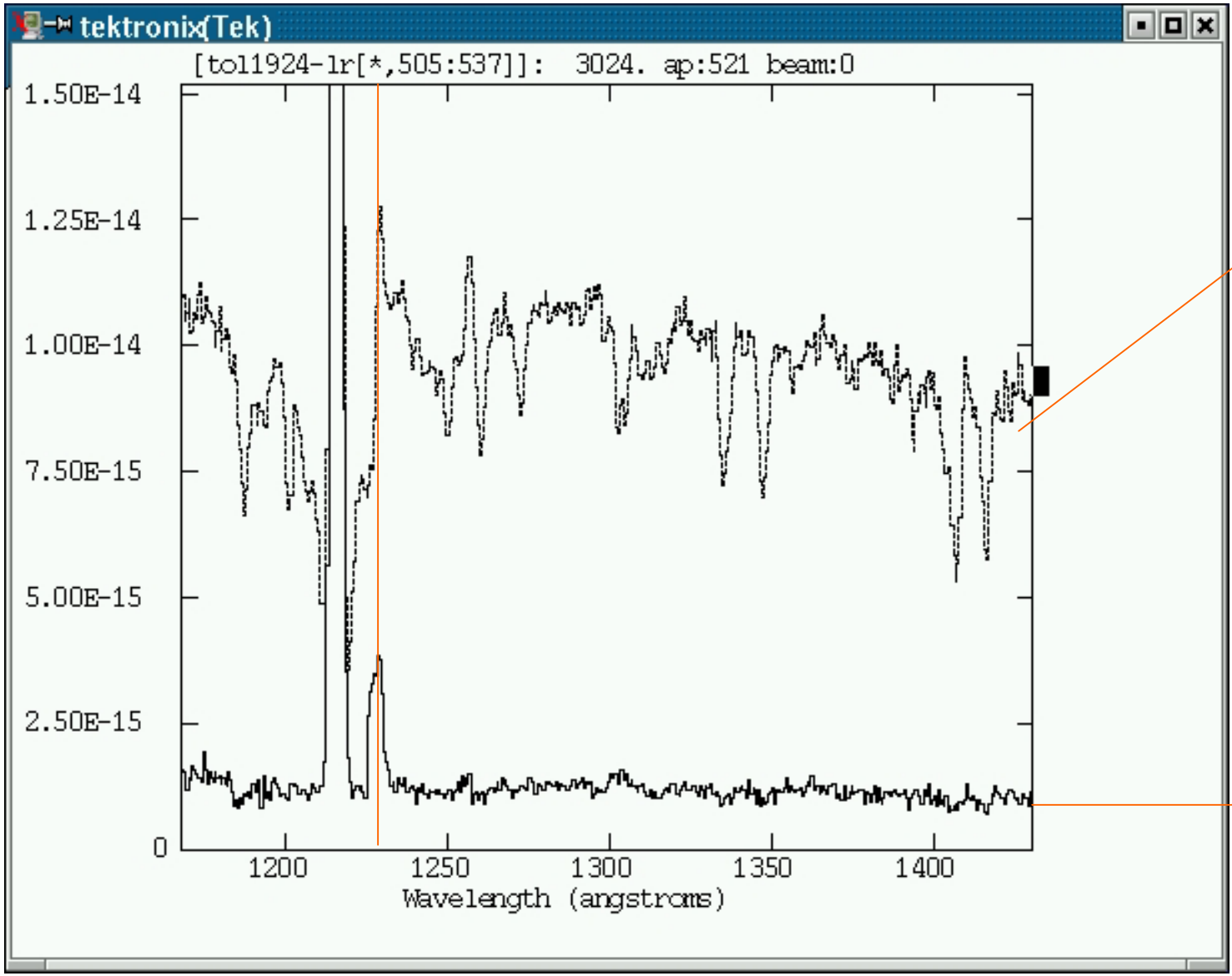



F122M
Knot B
Knot C
Knot A
N
E

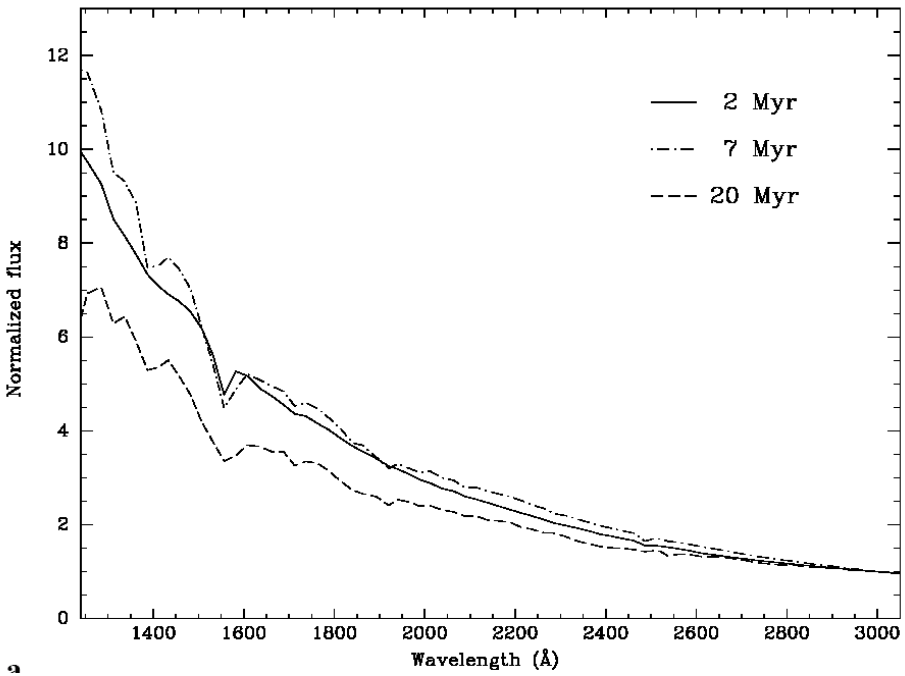

Knot B
Knot D
Knot C
Knot A

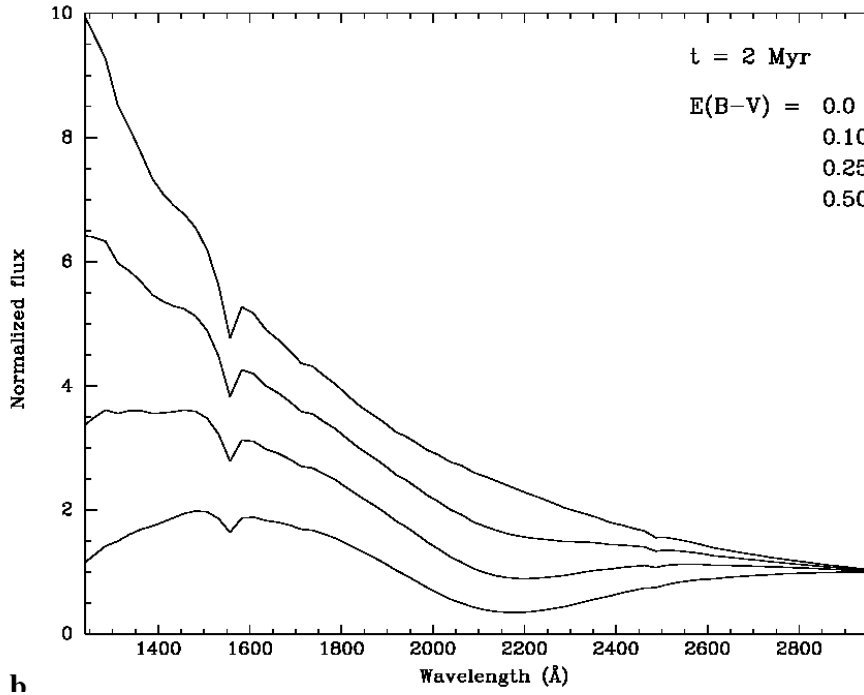
Effects disturbing Lyman alpha imaging

- Slope of the UV continuum (age, reddening)
  - *Imaging in different colors*
- Galactic Lyman alpha absorption
  - *Convolution of filter with expected Voigt profile*
- Underlying stellar Lyman alpha absorption
  - *Calibration with stellar atmosphere models*
- Regions with P Cyg profile yield net zero Lyman alpha emission
  - Comparison with H alpha allows to identify these regions, and to map where the HI gas is outflowing.
- All they have to be converted into a Continuum Throughput Normalization factor (CTN) for the ACS set of filters.

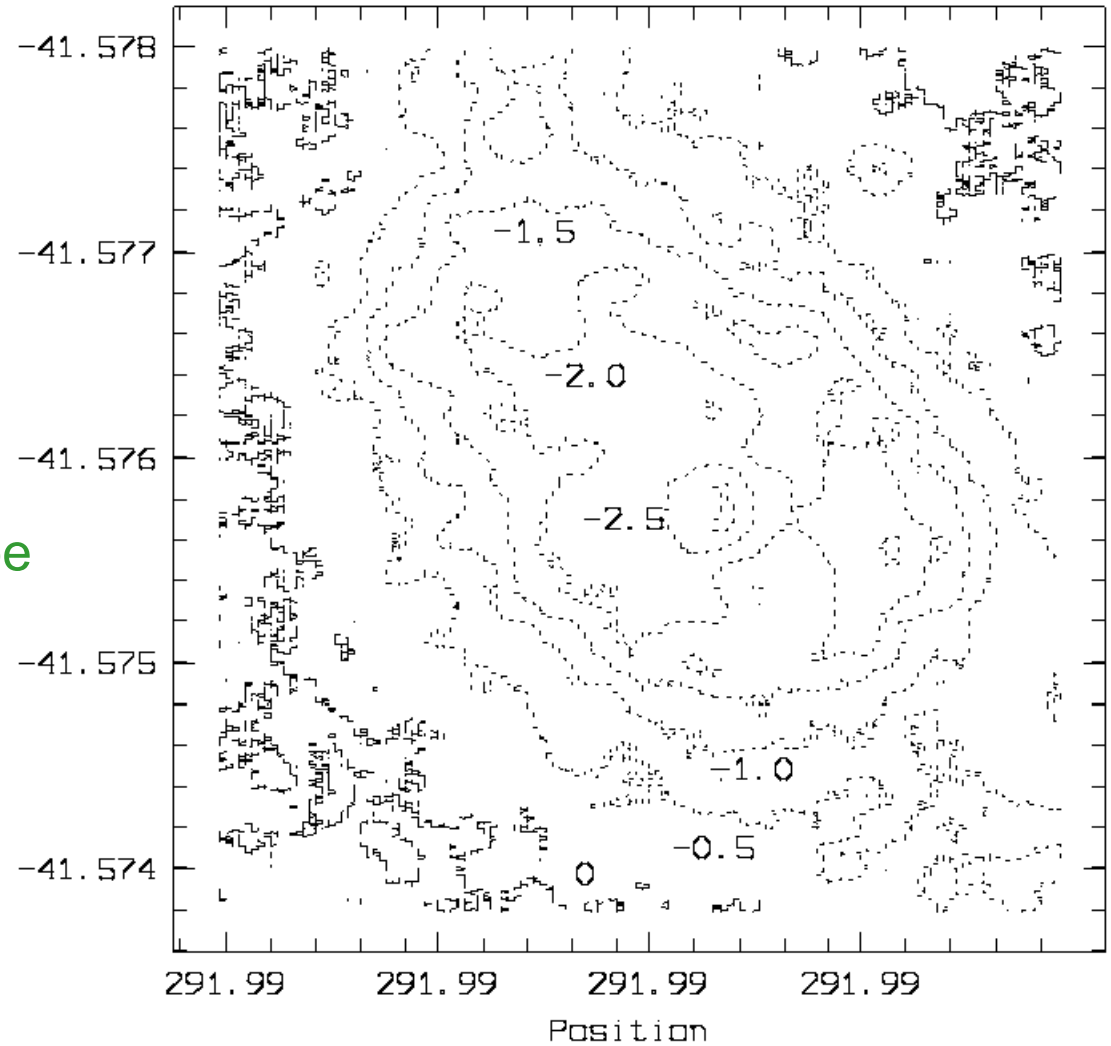

tektronix(Tek)
[tol1924-1r[*,505:537]]: 3024. ap:521 beam:0
1.50E-14
1.25E-14
1.00E-14
7.50E-15
5.00E-15
2.50E-15
0
1200
1250
1300
1350
1400
Wavelength (angstroms)
Knot A
(0.7")
Knot C

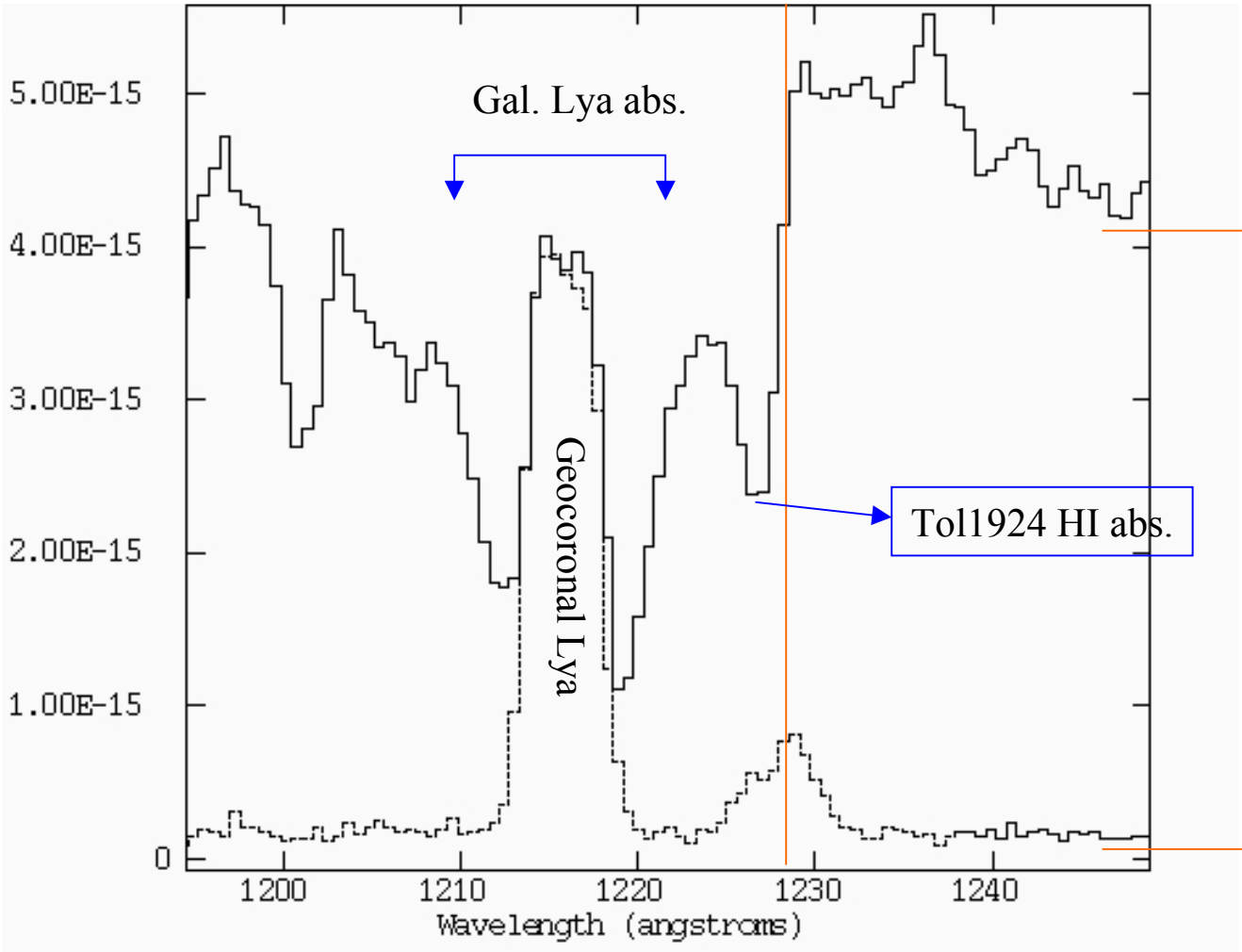
Effects of age and extinction on UV continuum

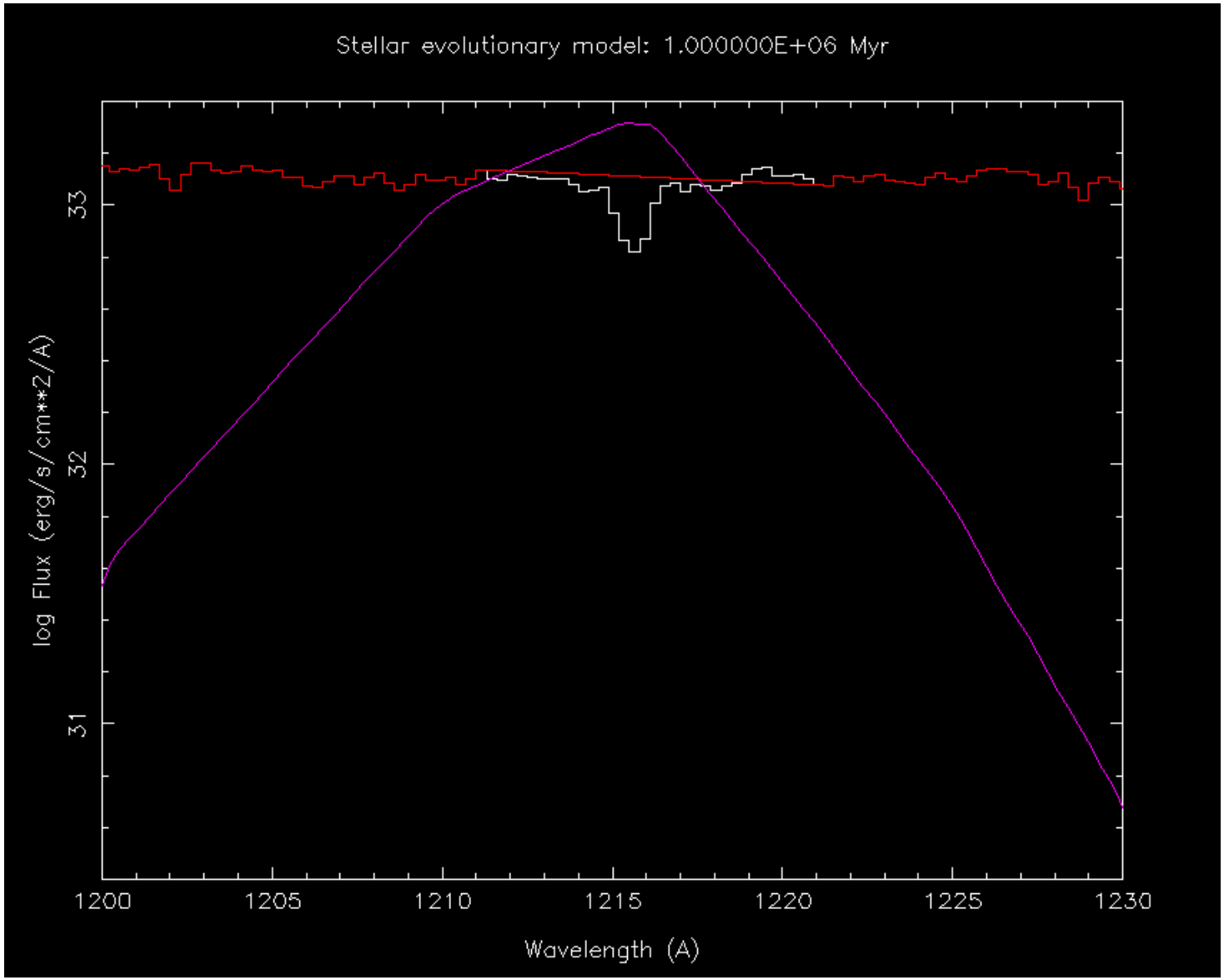


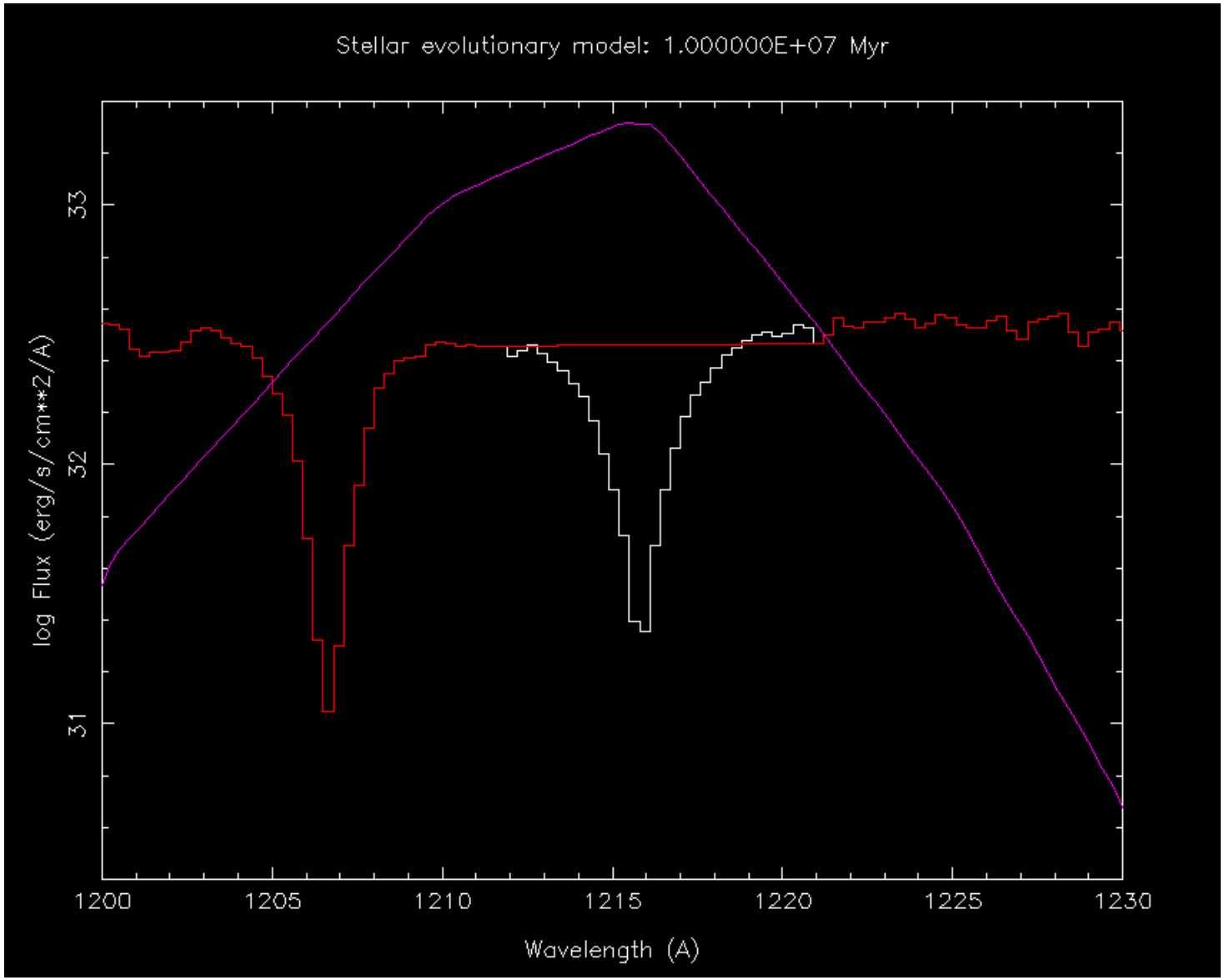


Map of UV continuum slope

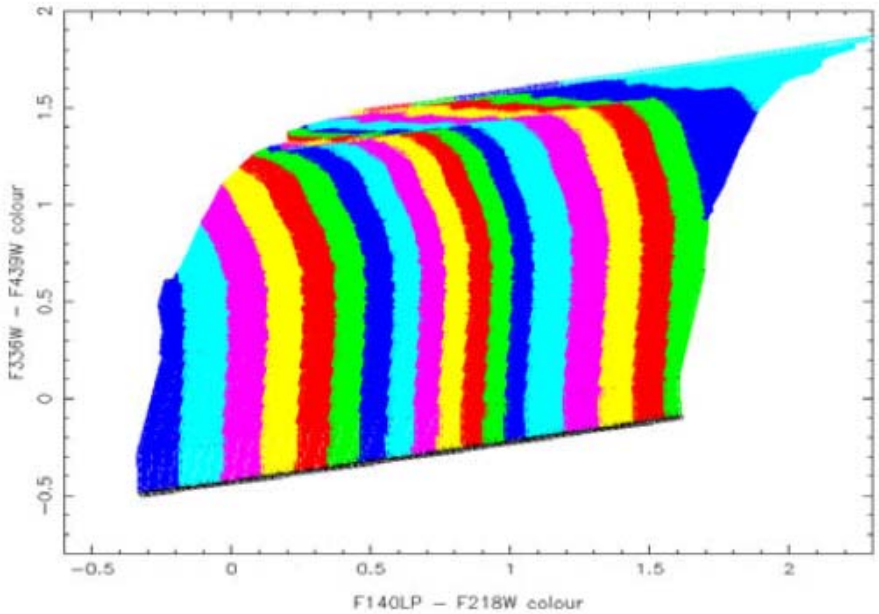


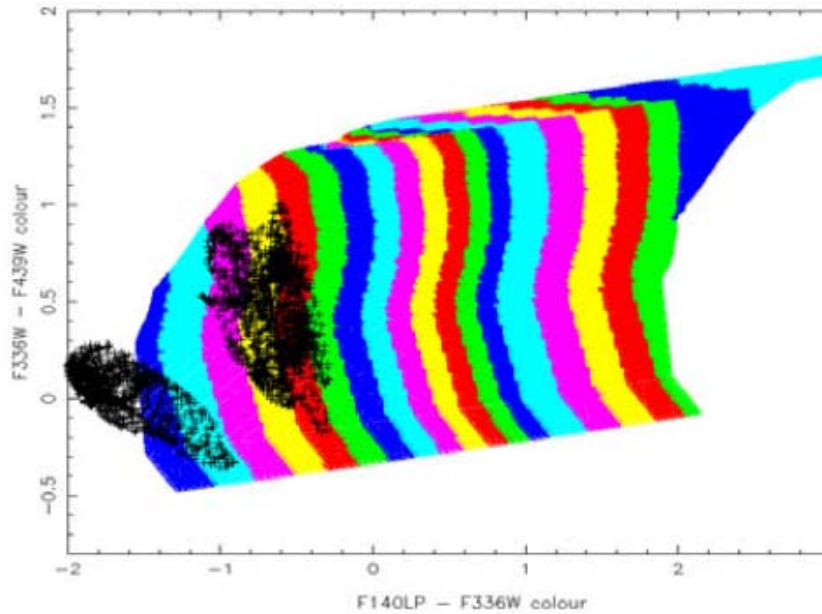

5.00E-15
4.00E-15
3.00E-15
2.00E-15
1.00E-15
0
1200
1210
1220
1230
1240
Wavelength (angstroms)
Gal. Lya abs.
Geocoronal Lya
Tol1924 HI abs.
Knot A
Knot C


Stellar evolutionary model: 1.000000E+06 Myr
log Flux (erg/s/cm**2/A)
33
32
31
1200
1205
1210
1215
1220
1225
1230
Wavelength (A)


Stellar evolutionary model: 1.000000E+07 Myr
log Flux (erg/s/cm**2/A)
33
32
31
1200
1205
1210
1215
1220
1225
1230
Wavelength (A)

- Taking all the effects into account, and calibrating the colors with SB99, we have been able to compute the required CTN factors all over the image.

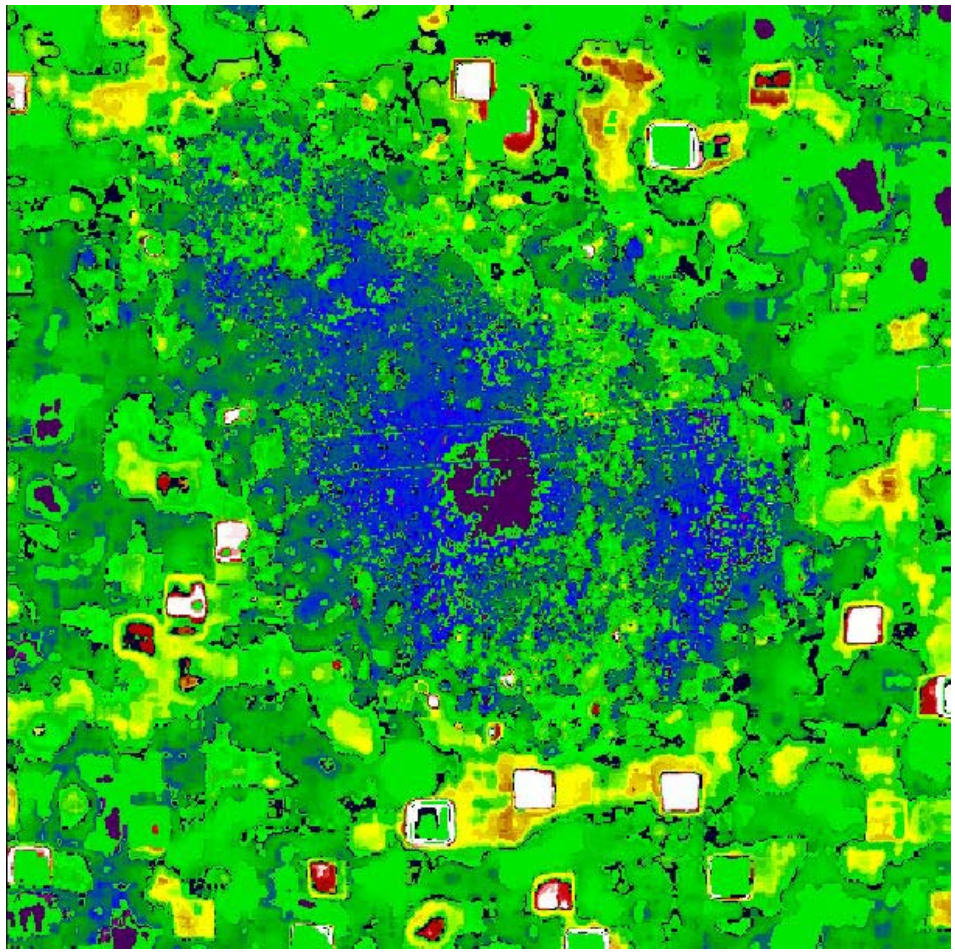




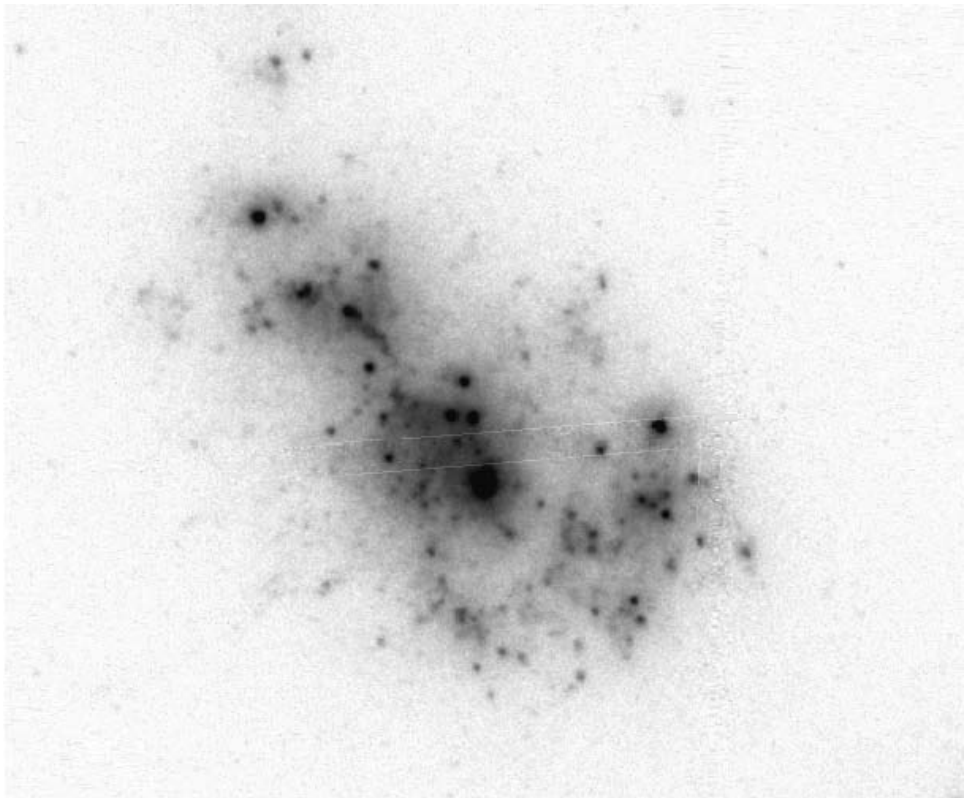
Map of CTN factors

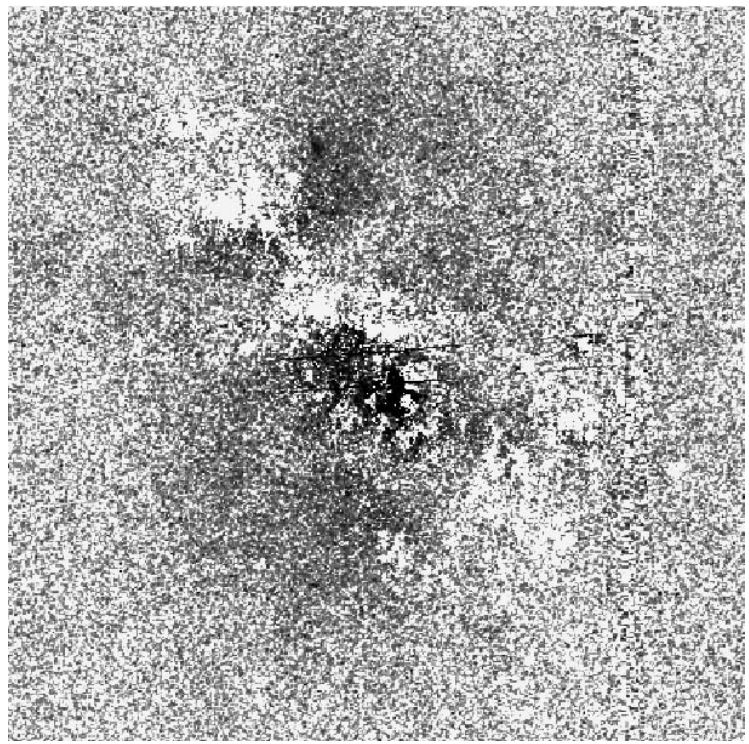
7 (blue/purple)
to
14 (red/white)

A flat continuum gives
CTN = 10.33 (green)



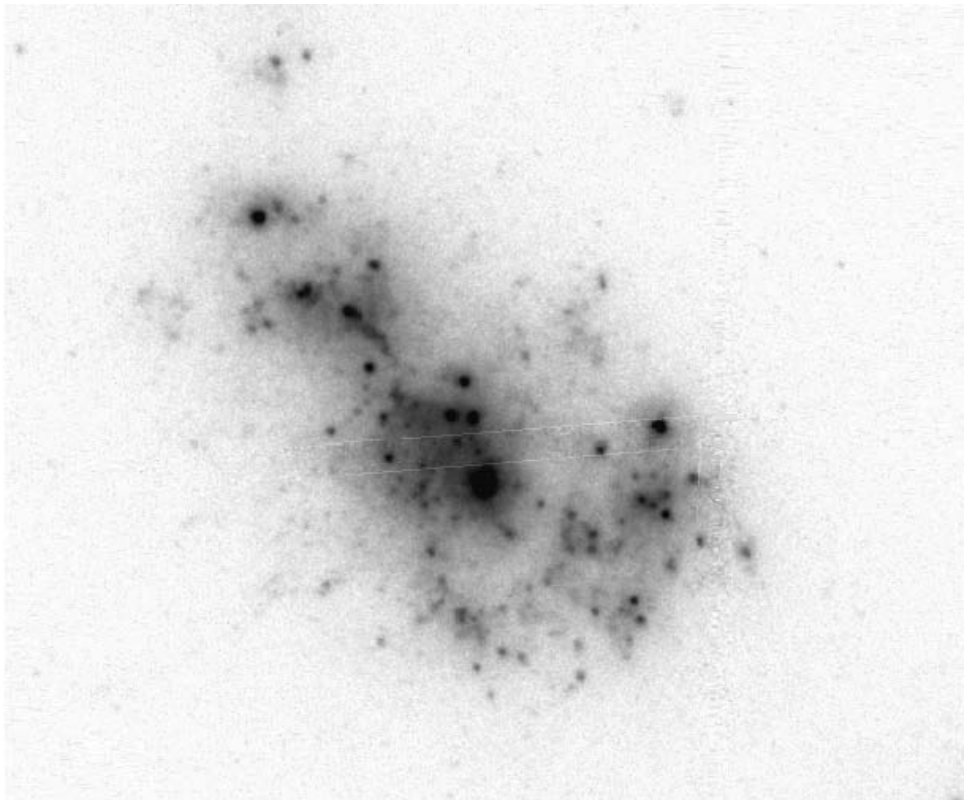
- Applying these CTN factors, the map of Lyman alpha emission Can be produced.

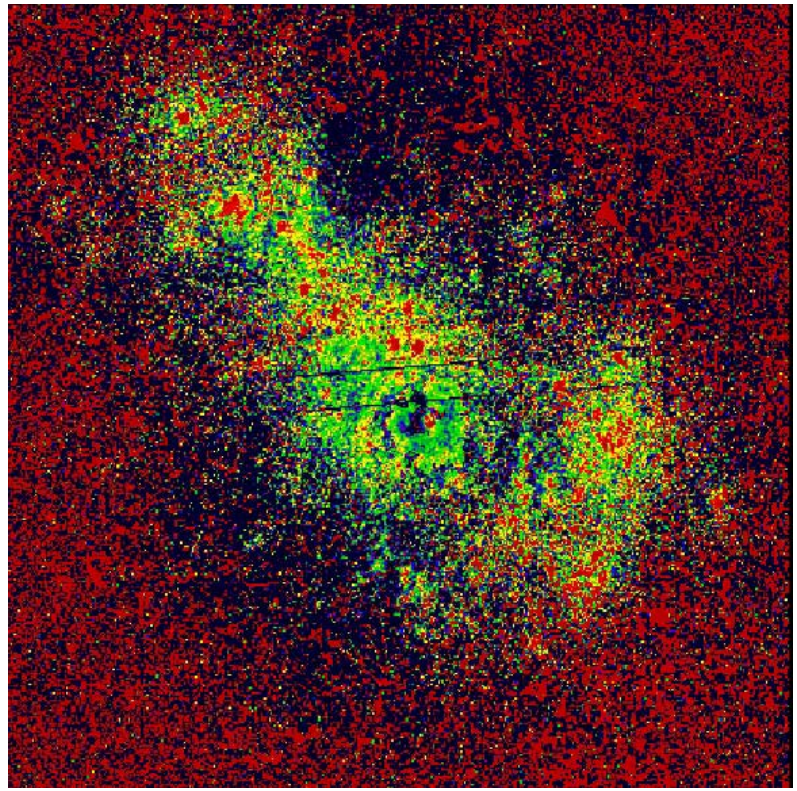




Dark = emission

Map of Lyman alpha EW

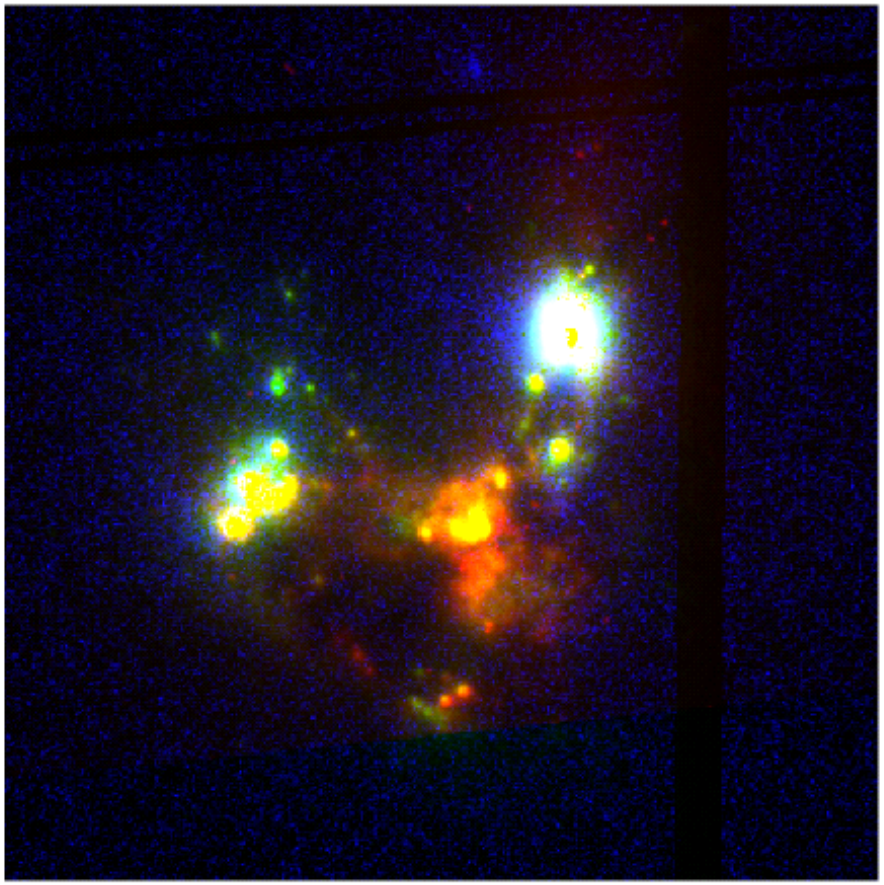




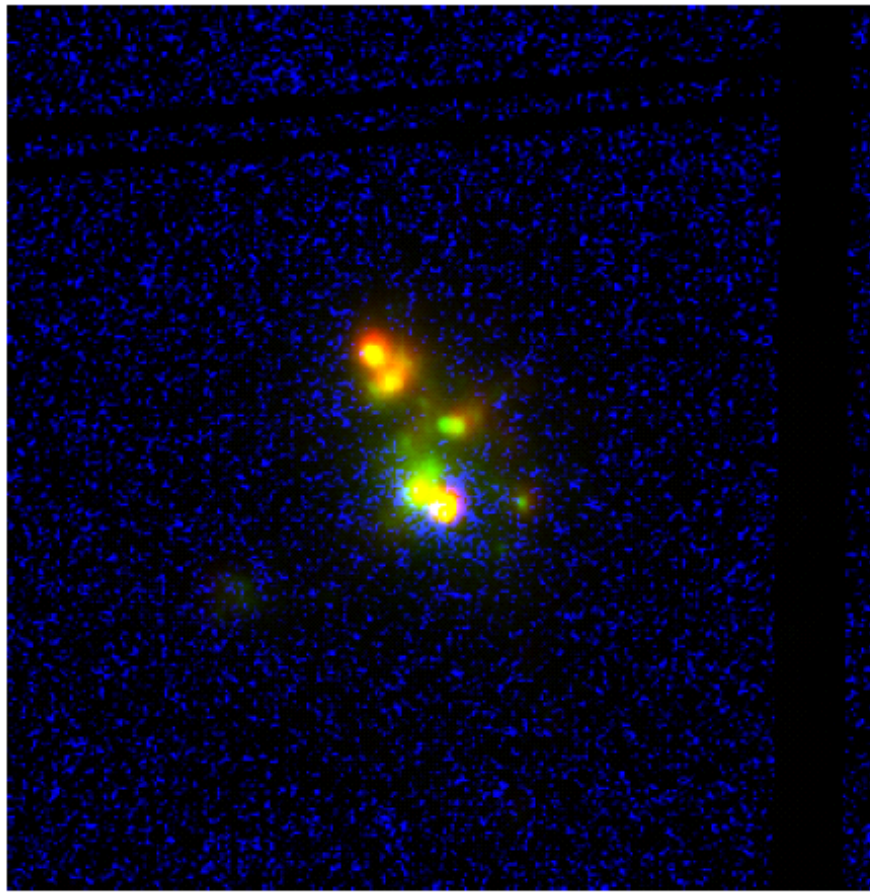
Dark = high EW (-50 to +50 Å)

- We are starting to apply the method to the other galaxies in the sample

ESO 350−38



SBS 0335−052



Red: Optical continuum Green: UV continuum Blue: Lyman alpha

Conclusions

- Imaging the Lyman alpha emission is a difficult task, even with narrower filters.
- Photometrical results obtained from high redshift galaxies should be taken with great care.
- Some additional information (UV slope, age) is in any case required to interpret correctly this kind of data.