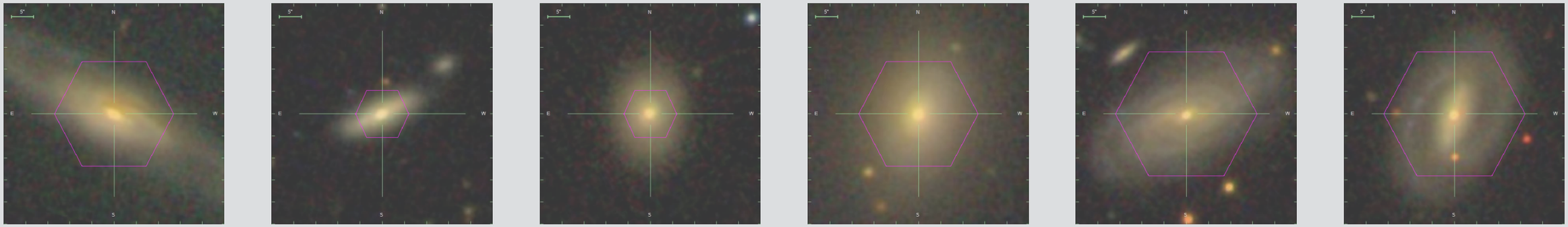
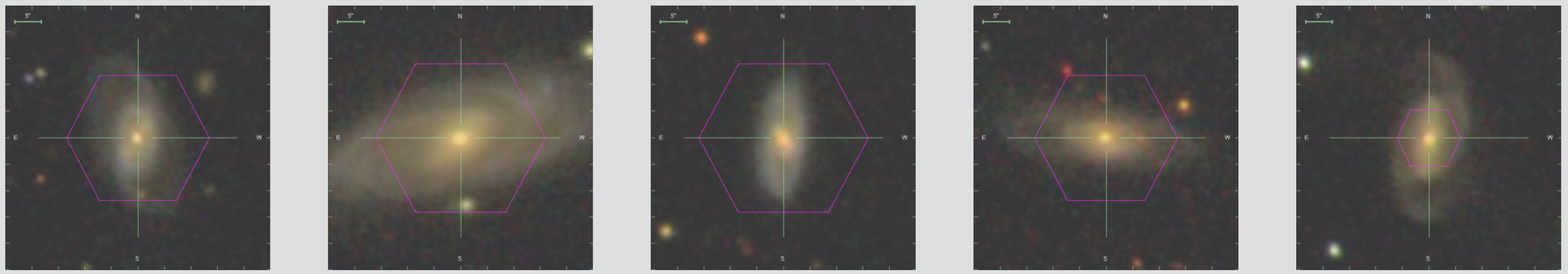
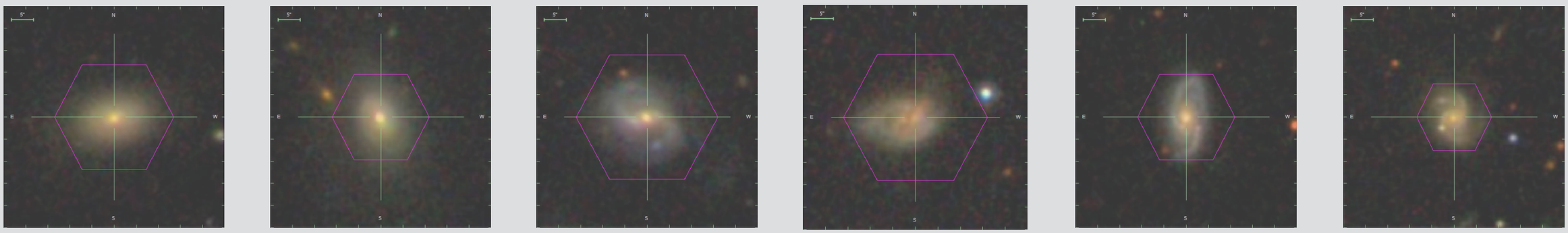


Asymmetric kinematics features within galaxies at z=0.06 as revealed by MaNGA

Barbara Mazzilli-Ciraulo, supervised by Anne-Laure Melchior and Françoise Combes





Detecting double-peaked spectral features

RCSED

Value-added catalog
800,299 galaxies
from SDSS DR7

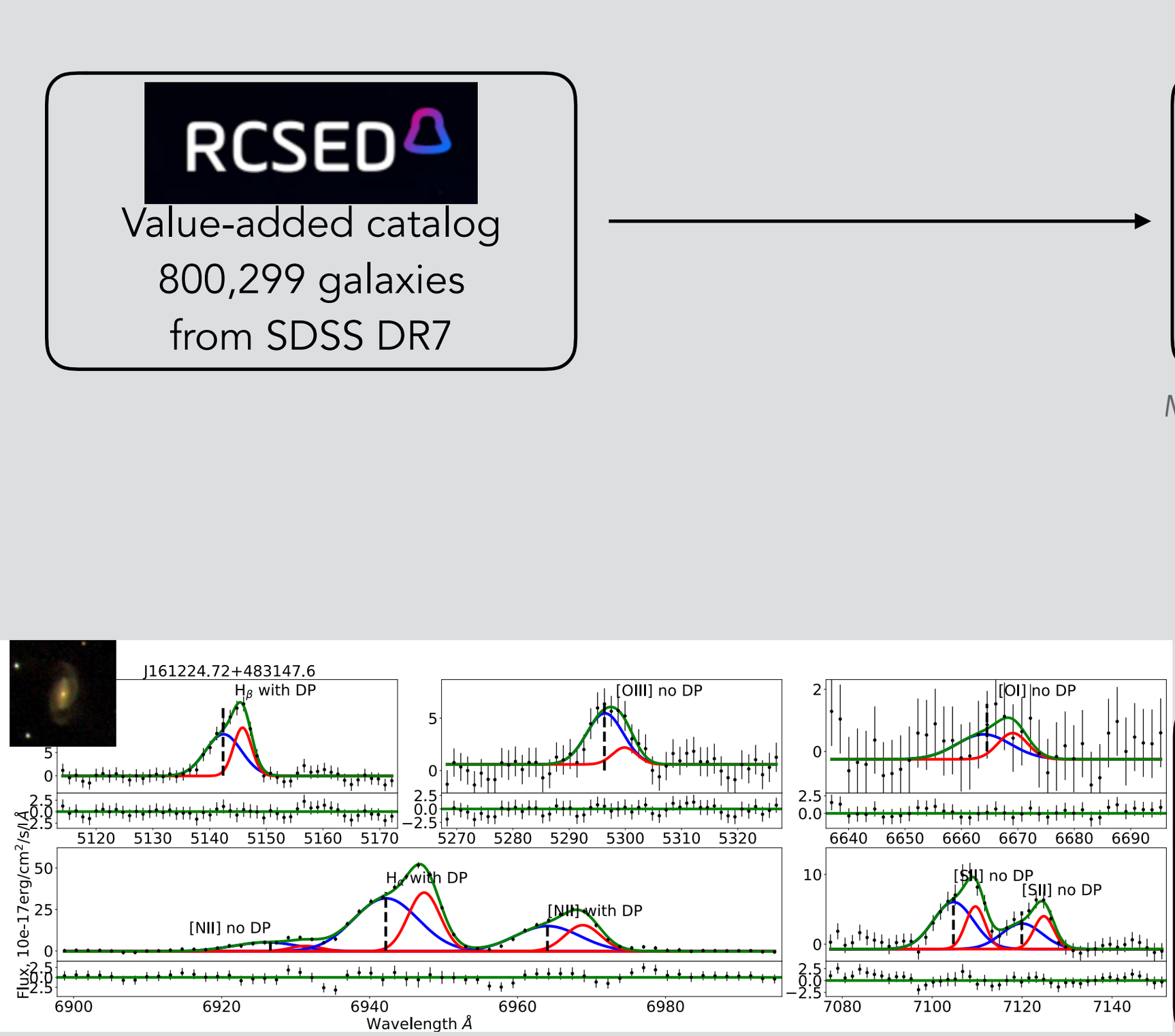
Double peak catalog

Maschmann et al. (in prep)

5289 galaxies

0.6%

Maschmann & Melchior, arXiv:1906.05629



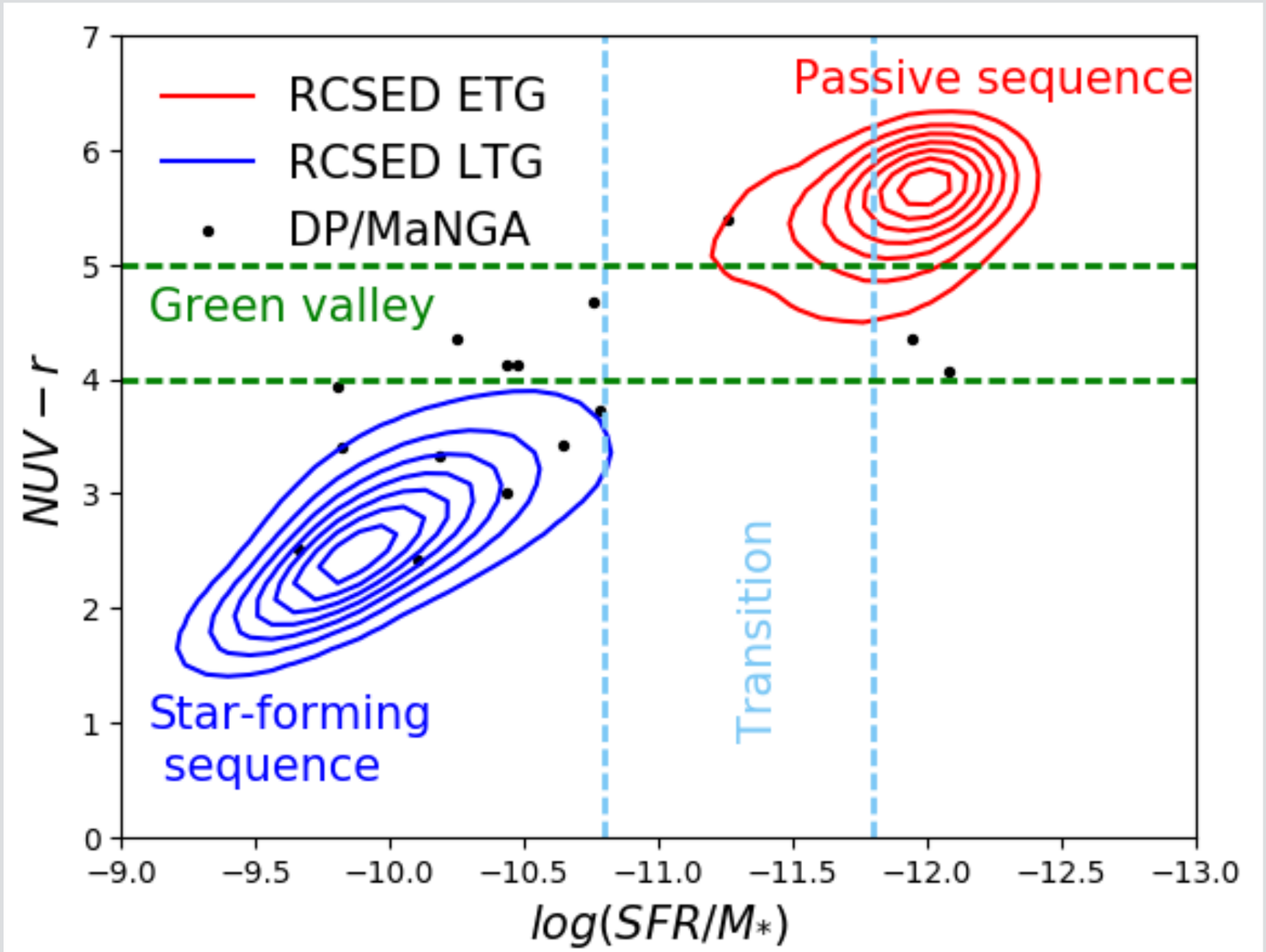
40% of S0
2 different components
Isolated
Ongoing star formation

3-arcsec SDSS fiber integrated spectrum

Double peaks: a tool to investigate quenching?

→ S0 lead to ellipticals
Ellipticals lie on the red sequence

→ S0 as a result of mergers
(Fraser-McKelvie et al. (2018) and Eliche-Moral et al. (2018))



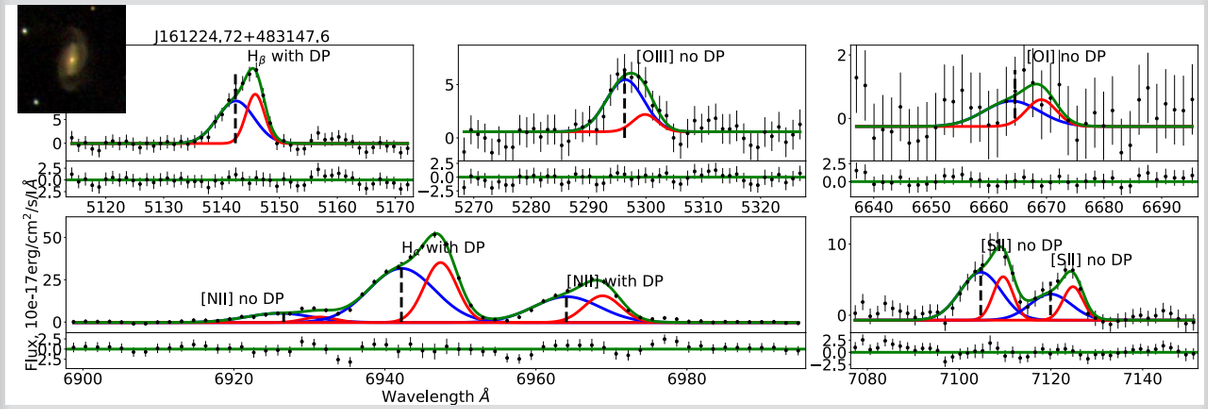
Passive sequence
Old/retired galaxies

The Green Valley:
Low levels of ongoing star formation

Star-forming sequence
Young galaxies
Active star formation

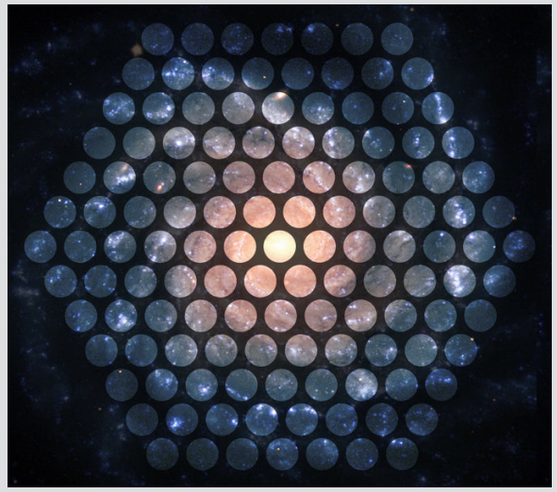
Double peak catalog: 5289 galaxies

Maschmann & al. (in prep.)



MaNGA survey (DR14): 2618 galaxies

Bundy & al. (2015)

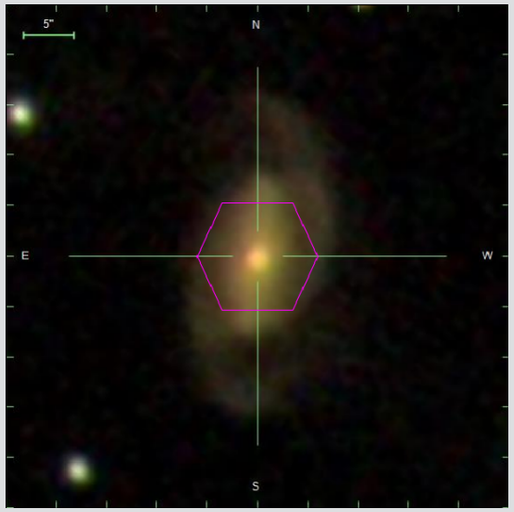


https://www.mpia.de

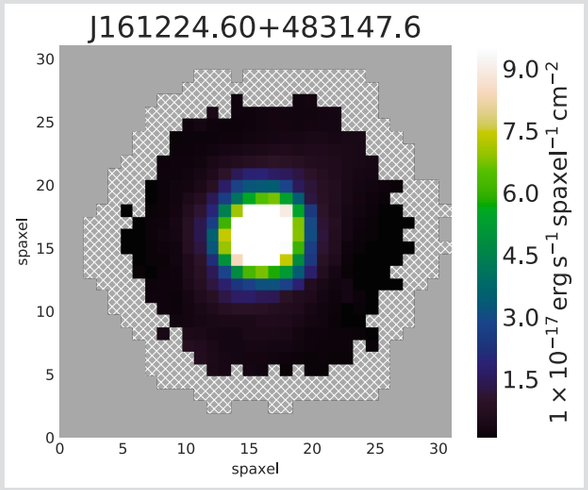
17 galaxies (<z>~0.06)

Second component?
Minor-merger?

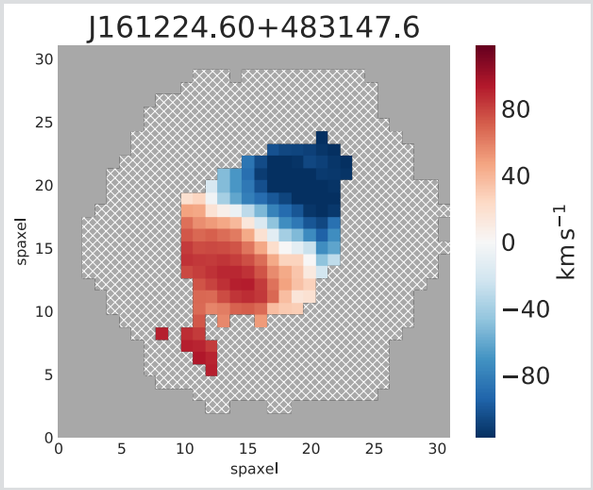
Maps as produced by the Data Analysis Pipeline



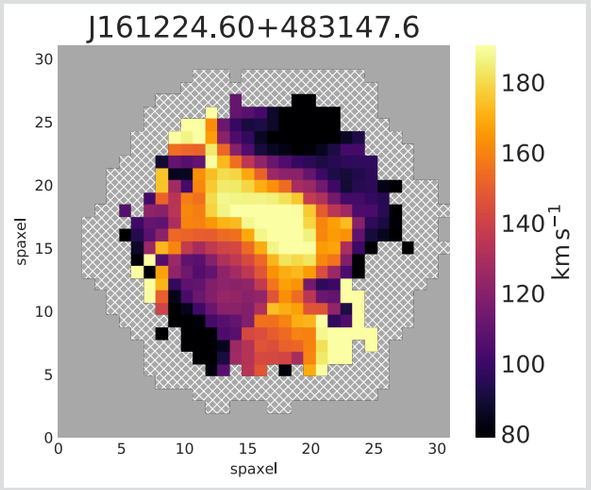
J 161224.6+483148



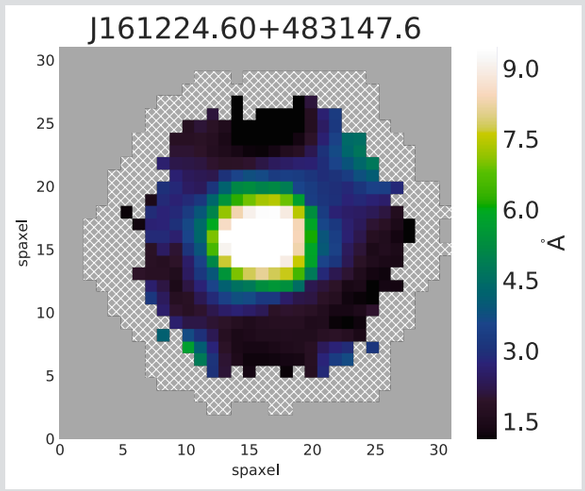
Hα flux



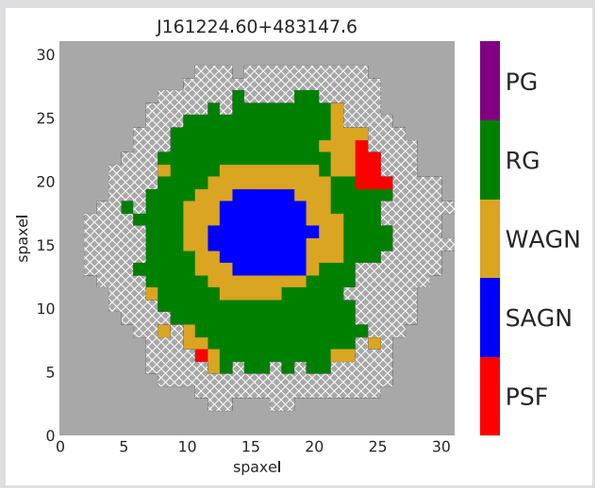
Gas velocity field



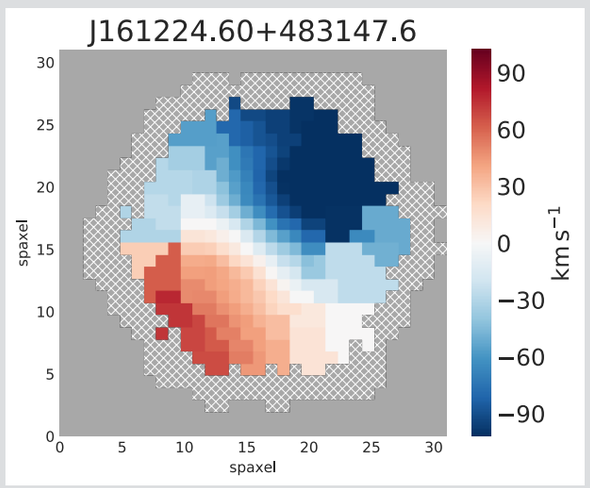
Hα sigma



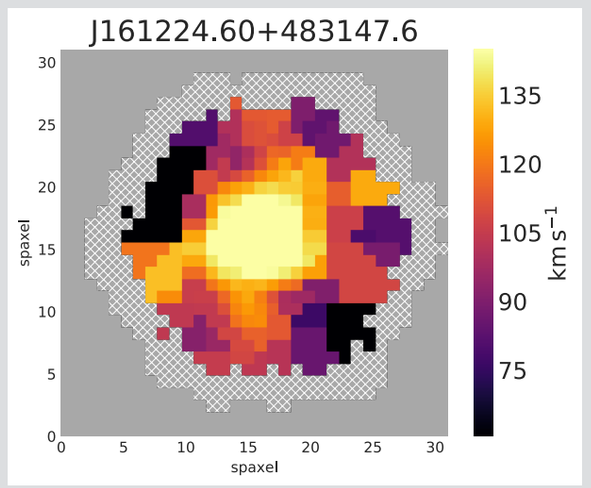
Hα equivalent width



WHAN diagram



Stellar velocity field

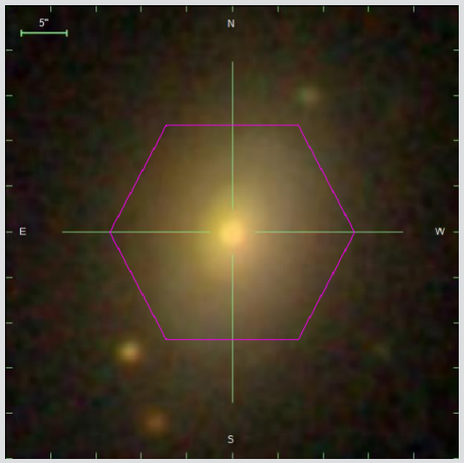


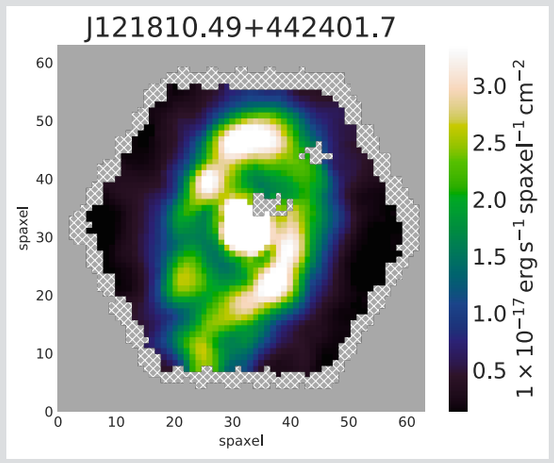
Stellar sigma

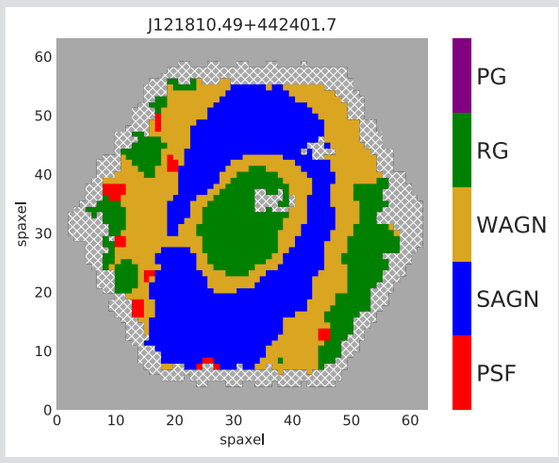
Hα flux

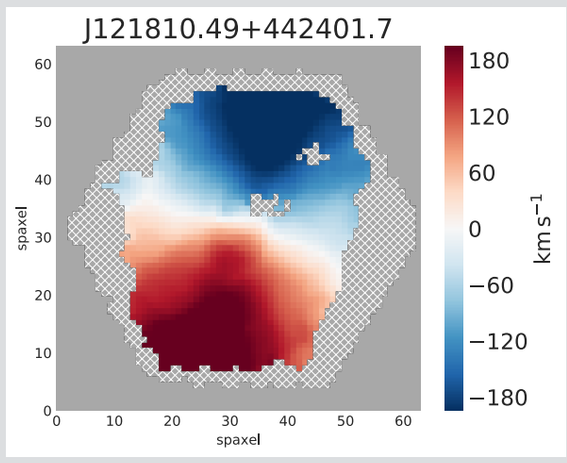
WHAN diagram

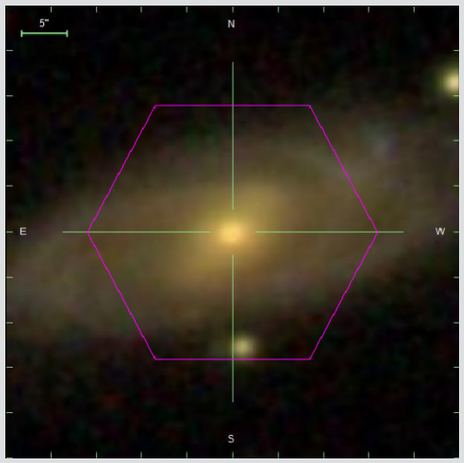
Gas velocity field

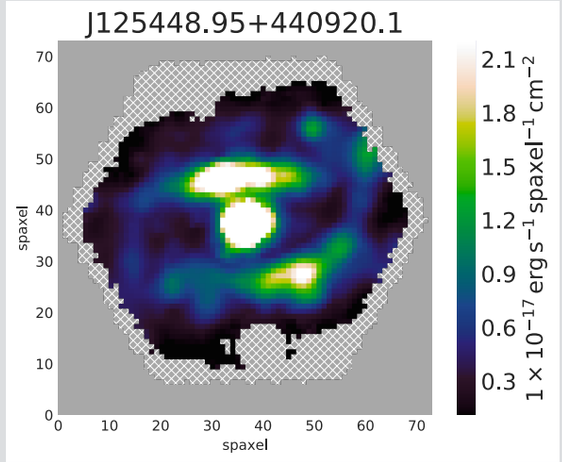


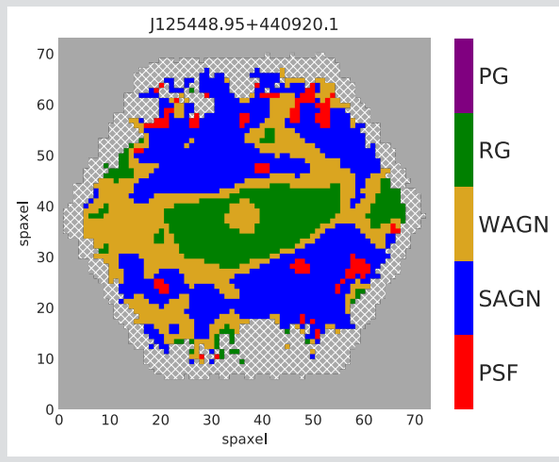


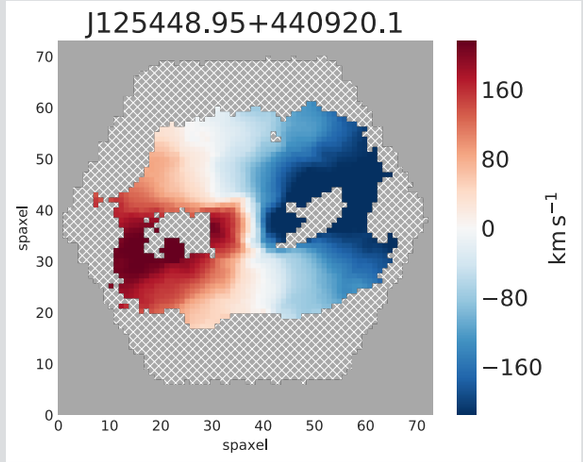


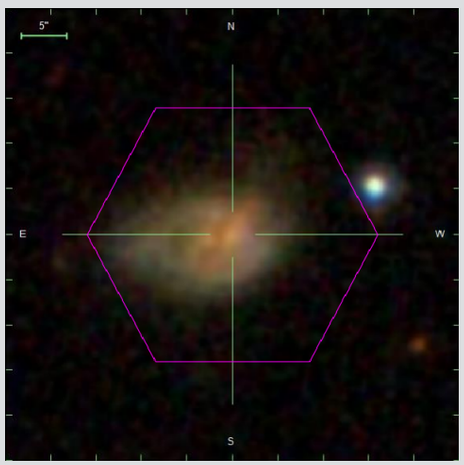


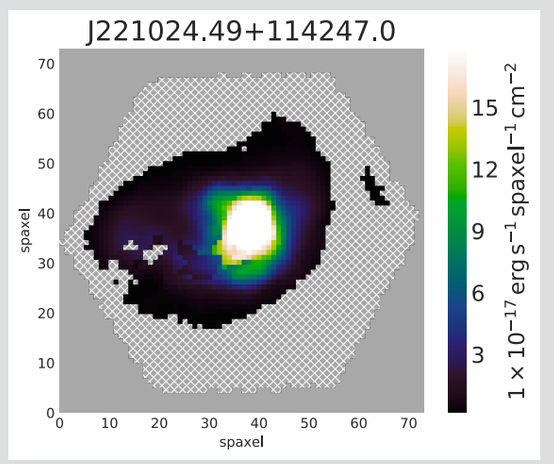


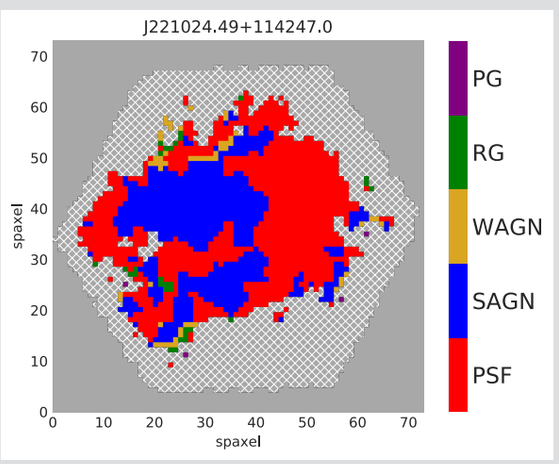


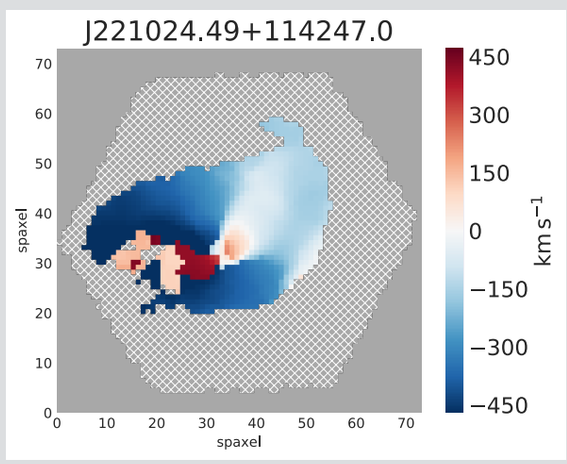


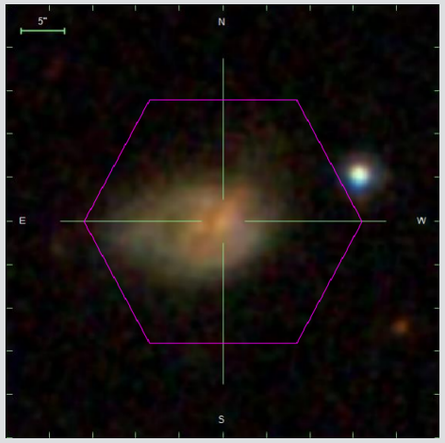


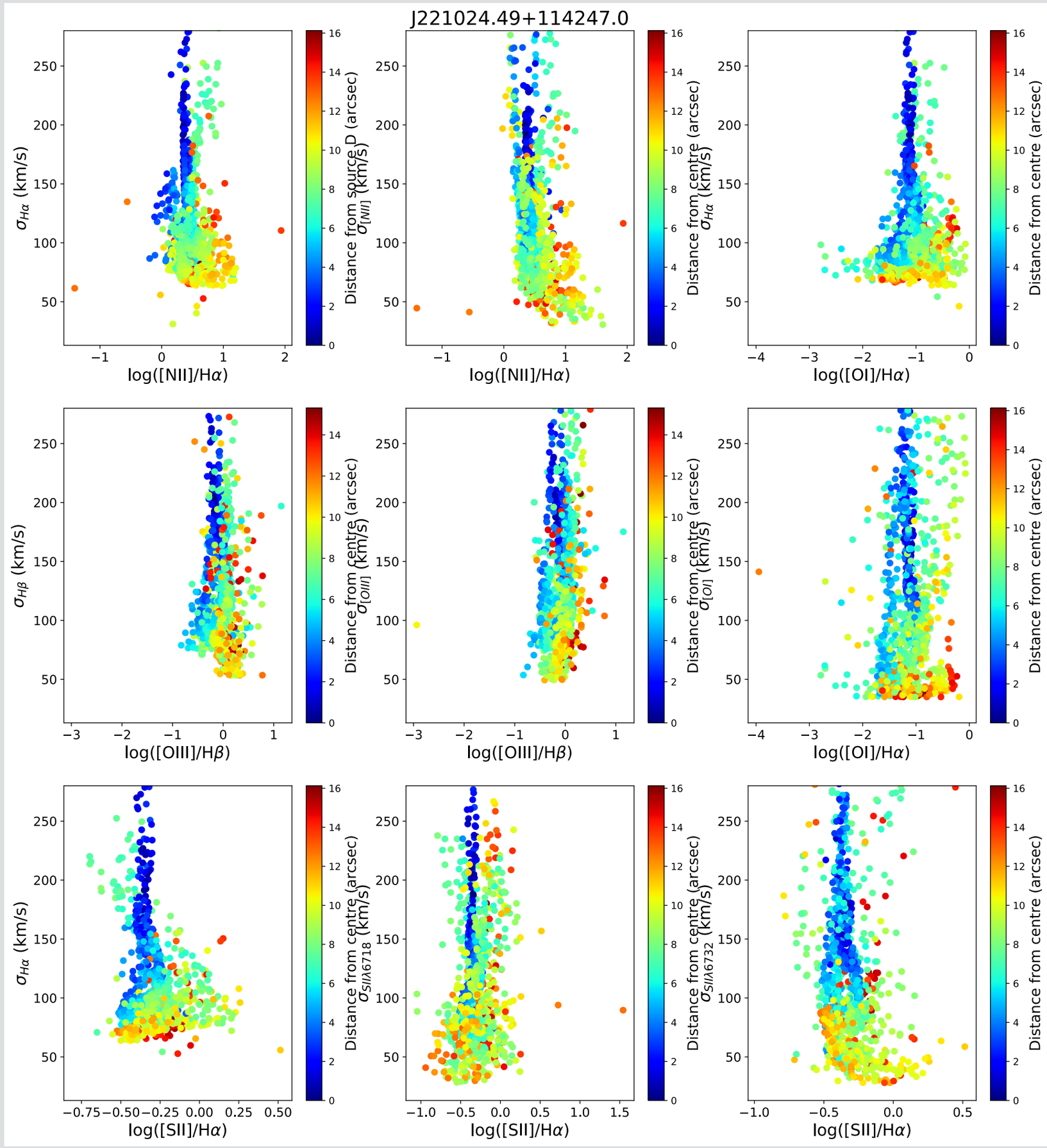


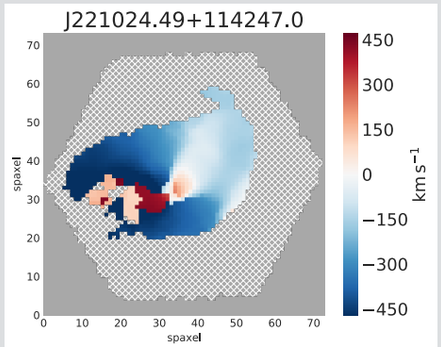




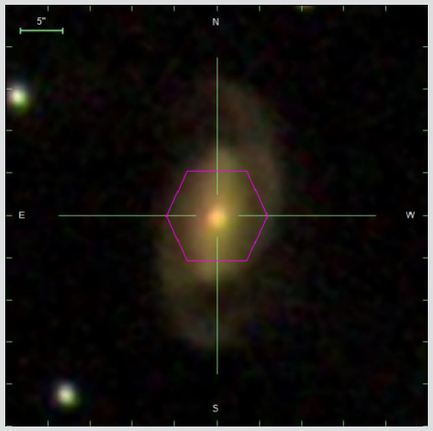


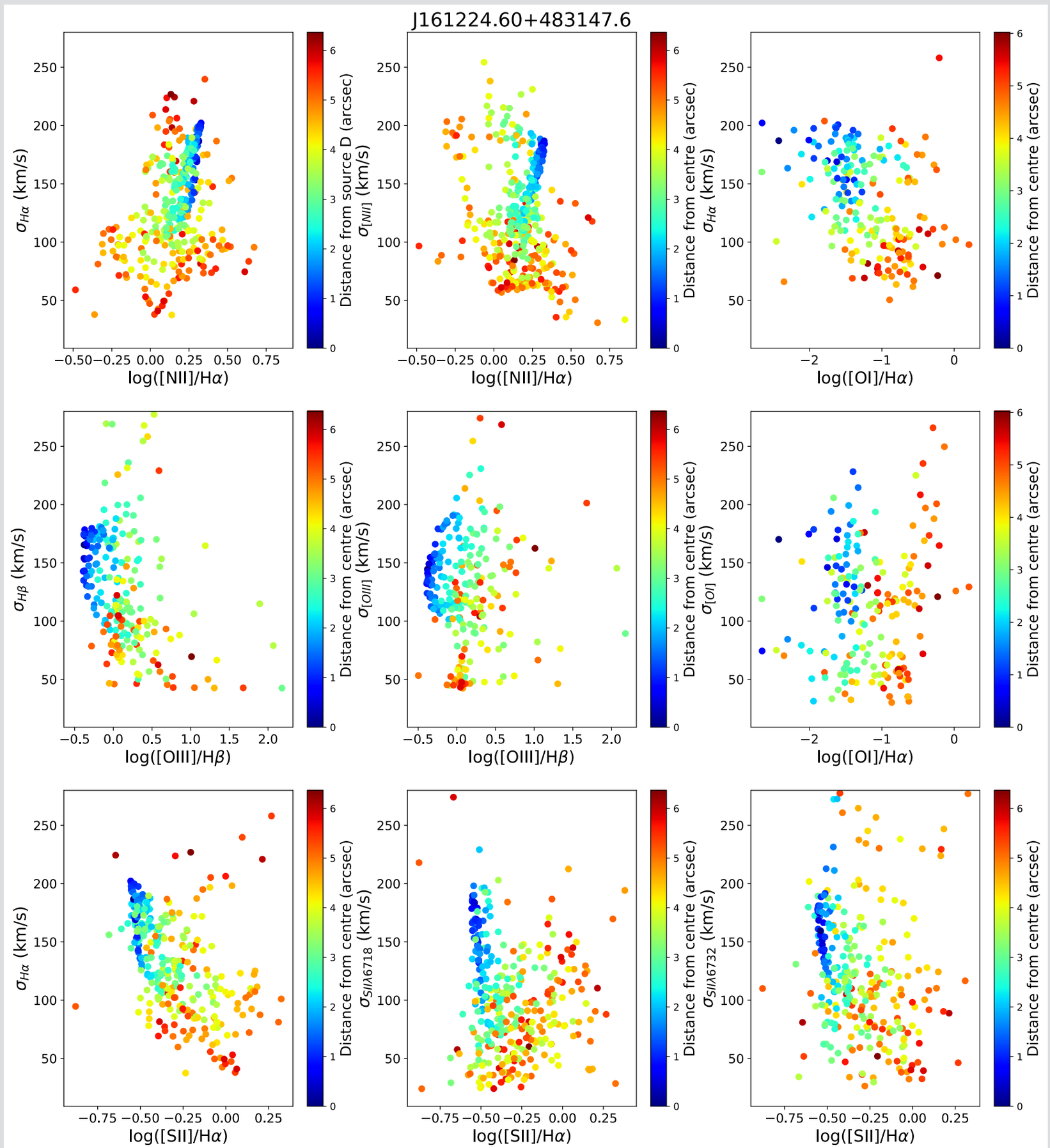


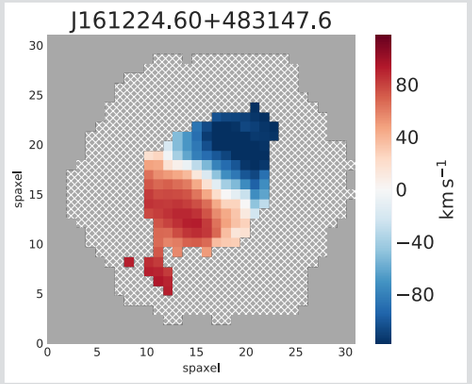




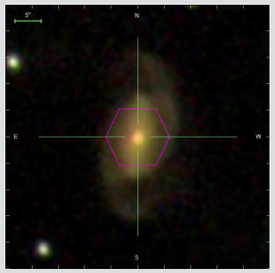
from Boselli & al. 2019

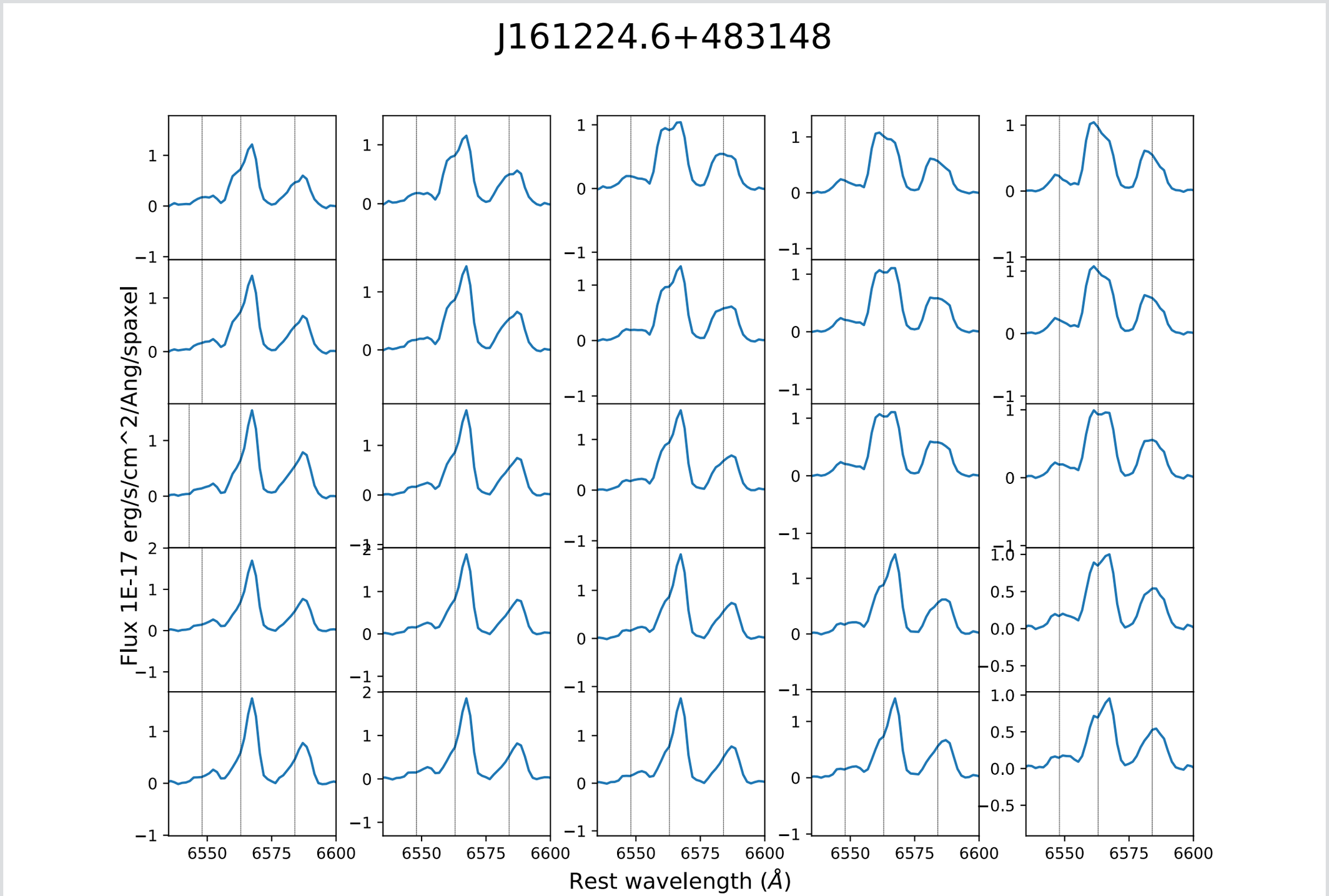

5"
N
E
W
S


J161224.60+483147.6
σHα (km/s)
log([NII]/Hα)
σ[NII] (km/s)
σHα (km/s)
log([OI]/Hα)
σHβ (km/s)
log([OIII]/Hβ)
σ[OIII] (km/s)
σ[OI] (km/s)
σHα (km/s)
log([SII]/Hα)
σSIIλ6718 (km/s)
σSIIλ6732 (km/s)
Distance from source D (arcsec)
Distance from centre (arcsec)


J161224.60+483147.6
spaxel
spaxel
km s−1

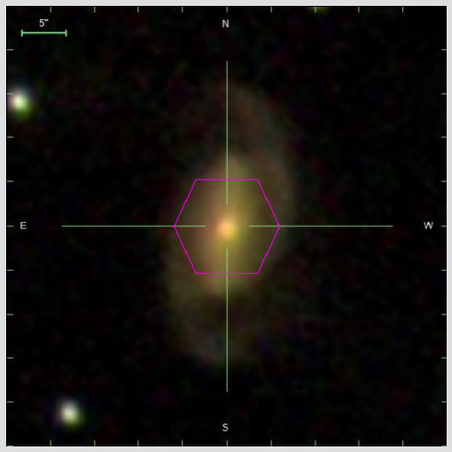
But...



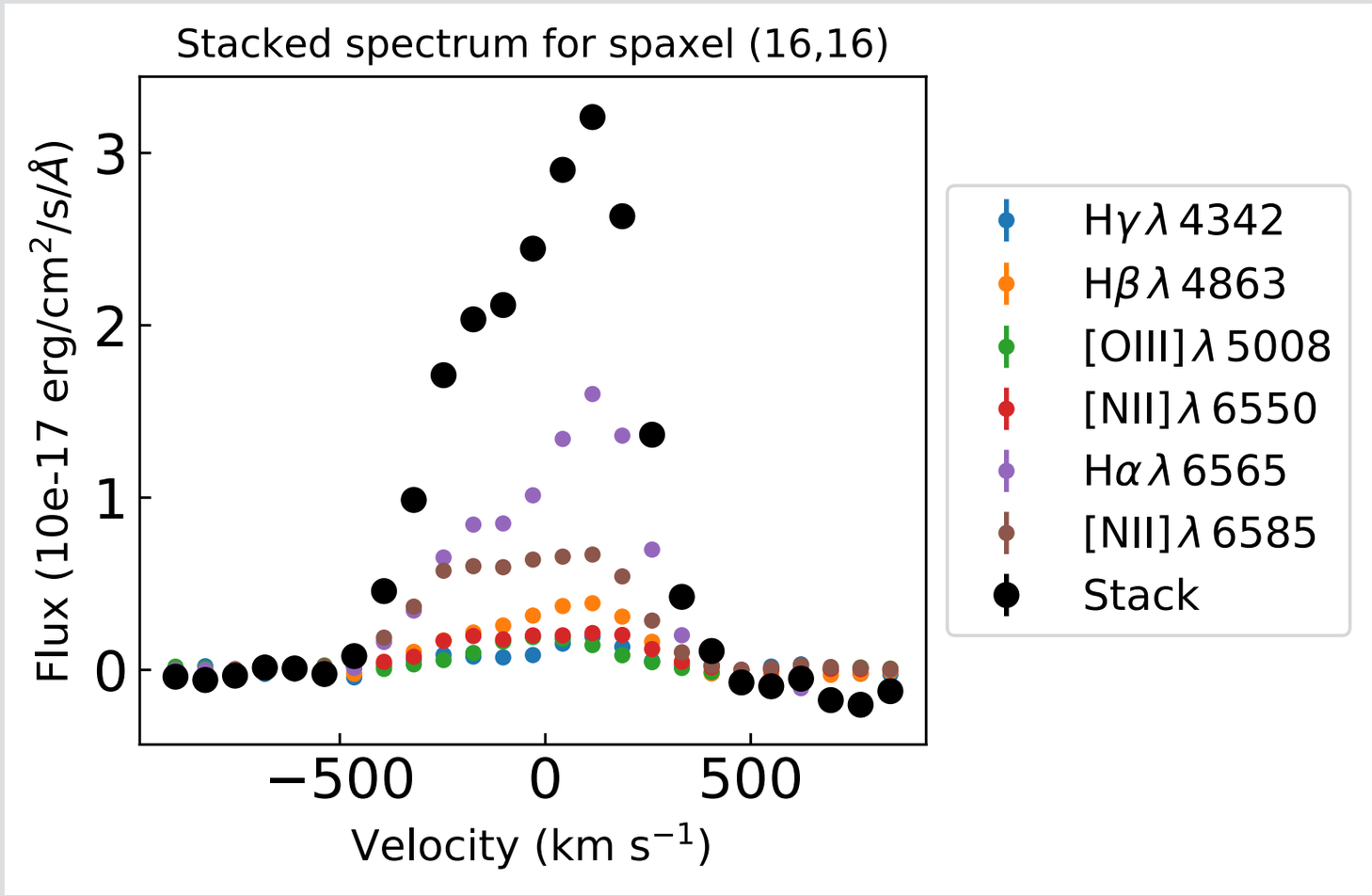


No consideration for the double-peaked features

Fitting procedure

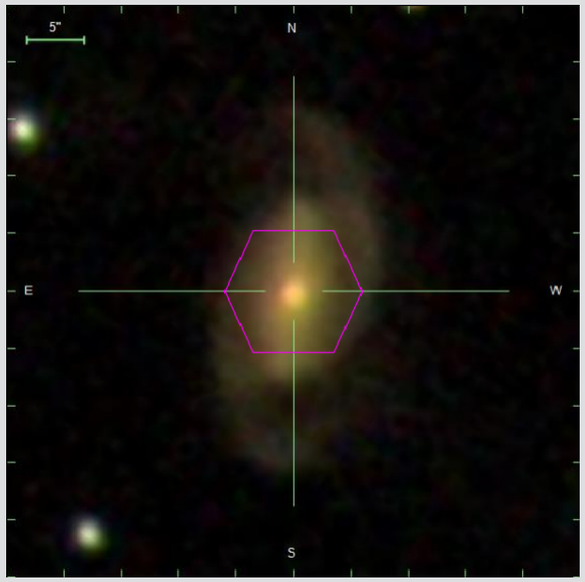


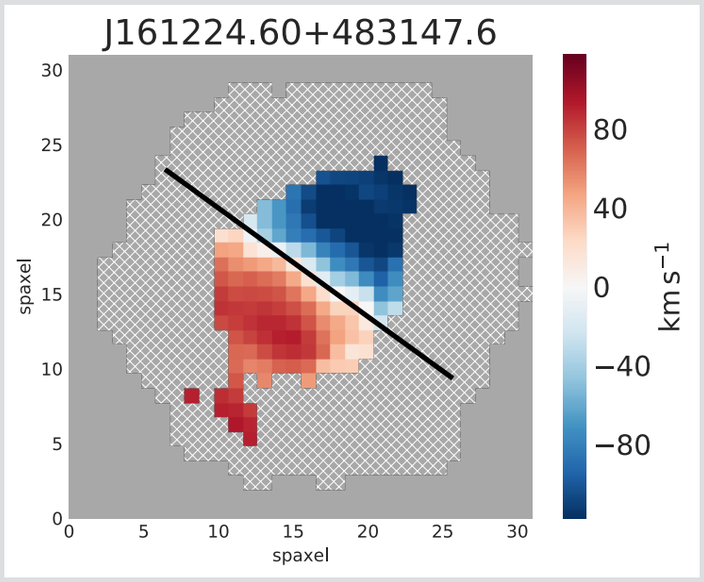
Stack all the lines for each spaxel

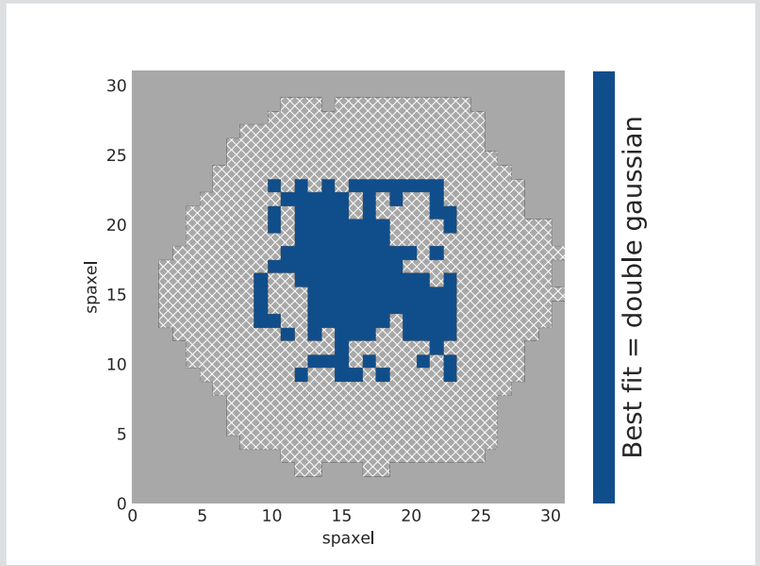


One single μ, one single σ for all the lines

Fit one single gaussian and a double gaussian





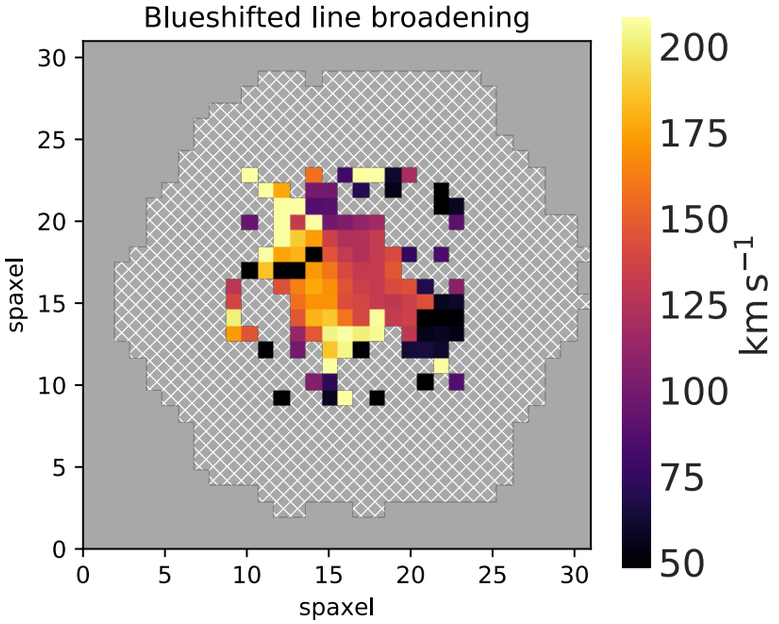


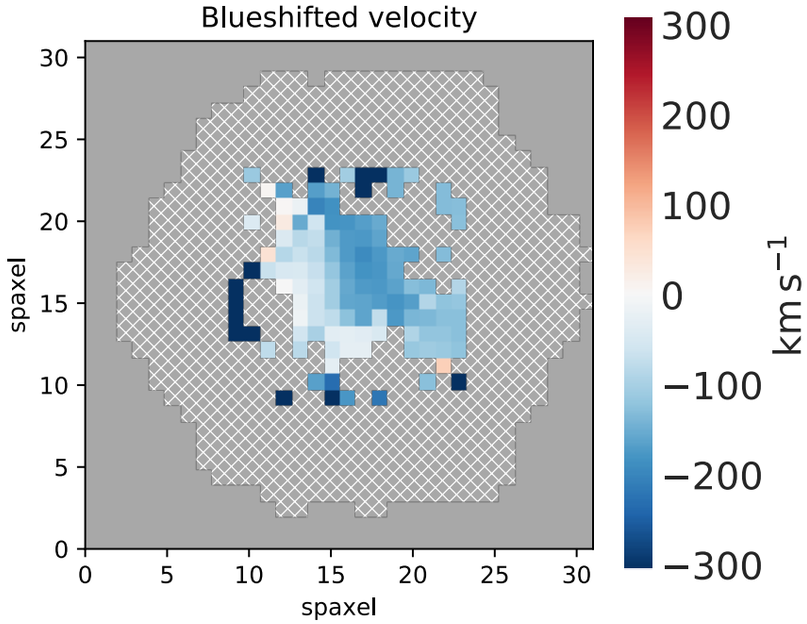
Single component vs. double components

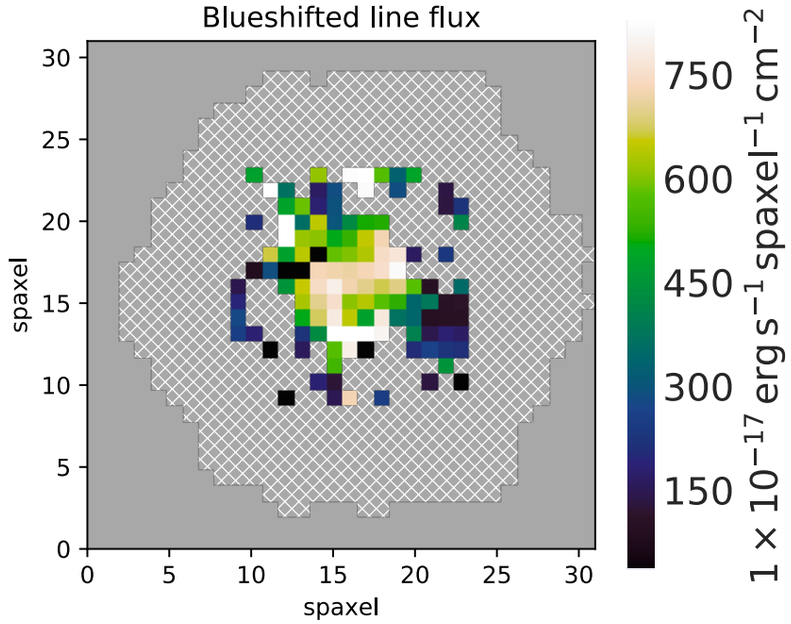
Set of maps:
Strongest component

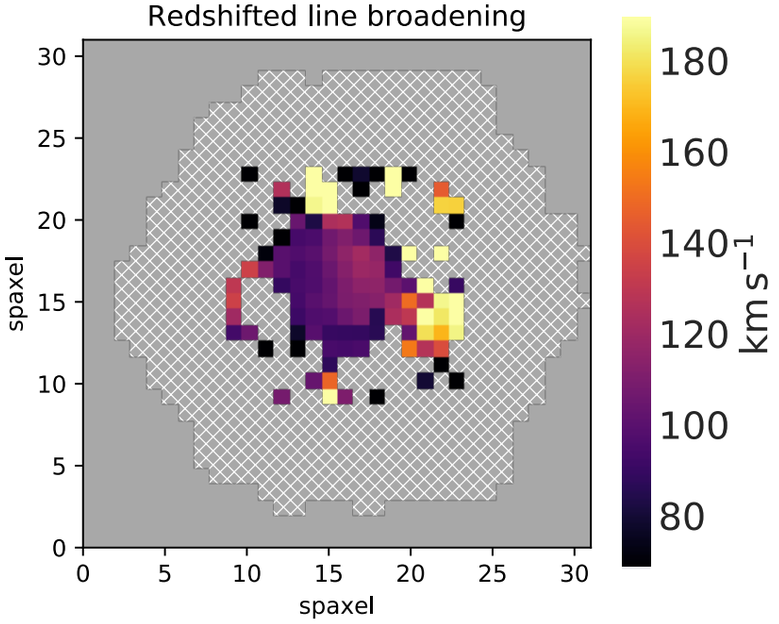
Set of maps:
Secondary component

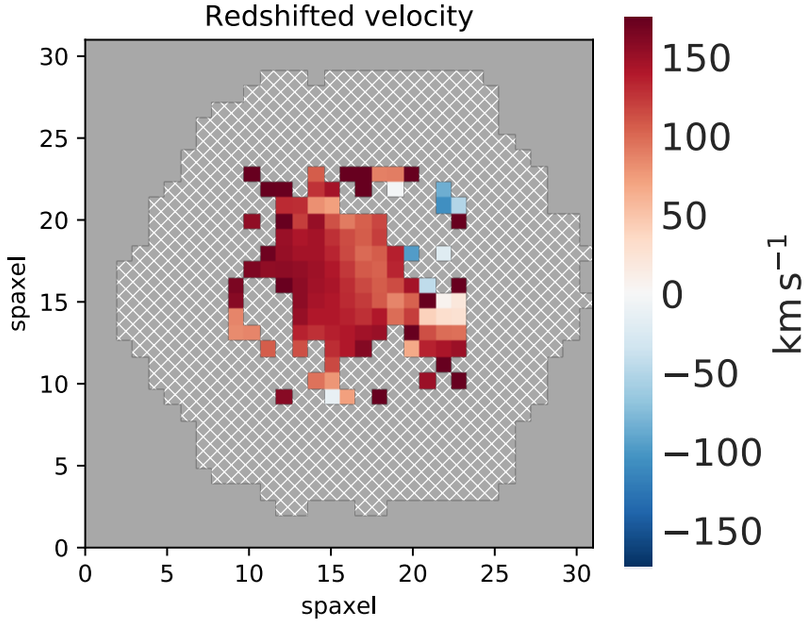
Distribution and velocity for each

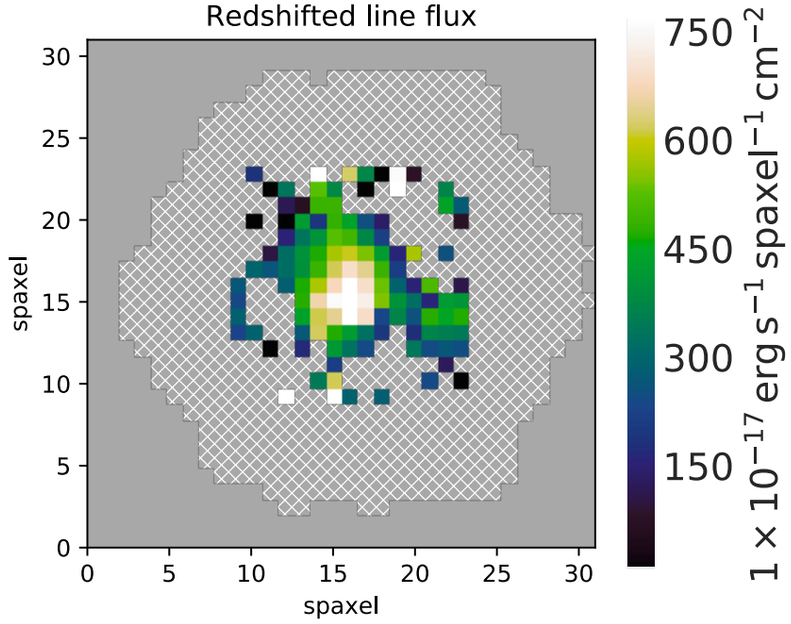

Blueshifted line broadening
spaxel
spaxel
200
175
150
125
100
75
50
km s^{-1}

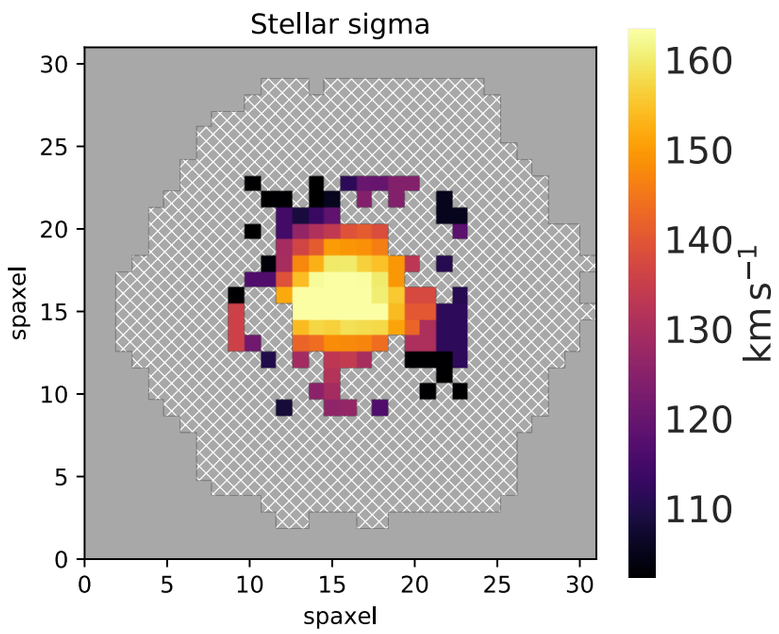

Blueshifted velocity
spaxel
spaxel
300
200
100
0
−100
−200
−300
km s^{-1}

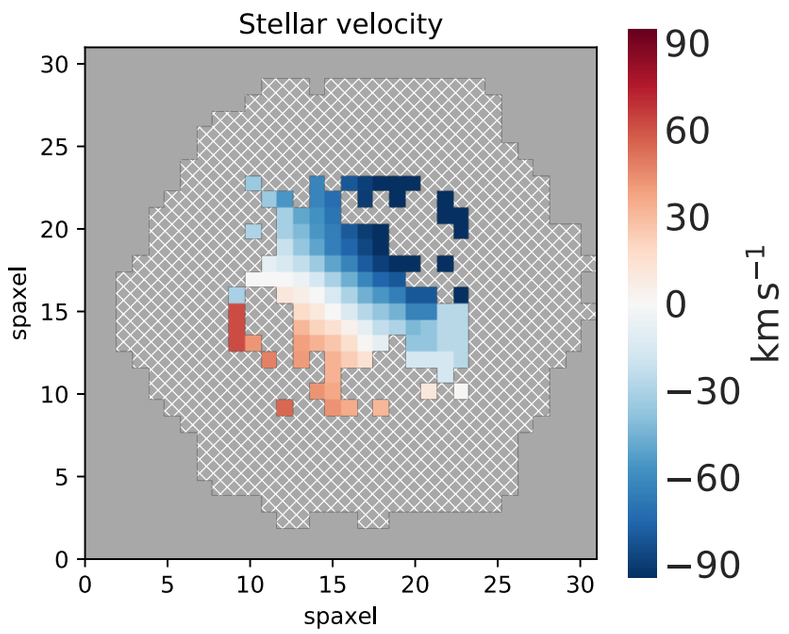

Blueshifted line flux
spaxel
spaxel
750
600
450
300
150
1 × 10^{-17} erg s^{-1} spaxel^{-1} cm^{-2}

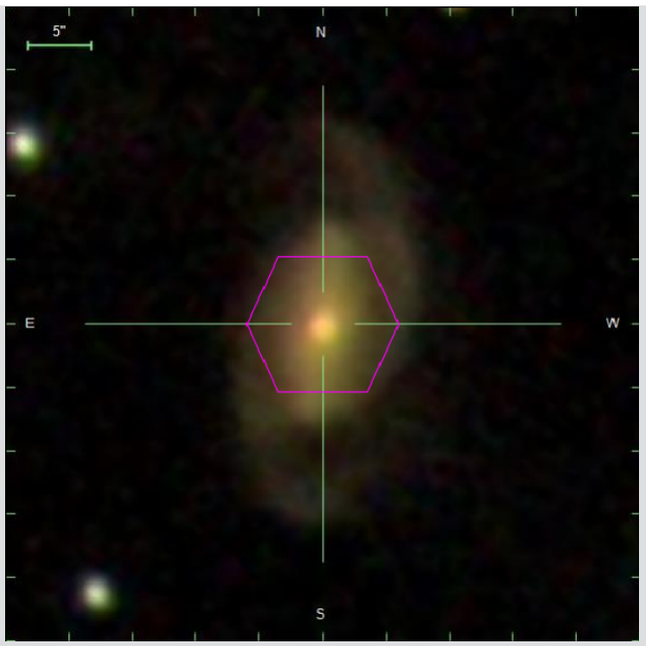

Redshifted line broadening
spaxel
spaxel
180
160
140
120
100
80
km s^{-1}


Redshifted velocity
spaxel
spaxel
150
100
50
0
−50
−100
−150
km s^{-1}


Redshifted line flux
spaxel
spaxel
750
600
450
300
150
1 × 10^{-17} erg s^{-1} spaxel^{-1} cm^{-2}


Stellar sigma
spaxel
spaxel
160
150
140
130
120
110
km s^{-1}


Stellar velocity
spaxel
spaxel
90
60
30
0
−30
−60
−90
km s^{-1}


5"
N
E
W
S

Summary

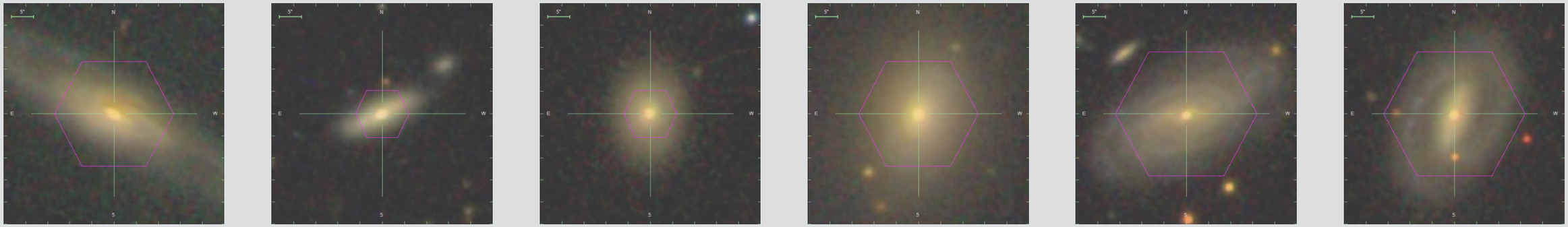
Double-peaked galaxies: 0.6% of the SDSS DR7 galaxies

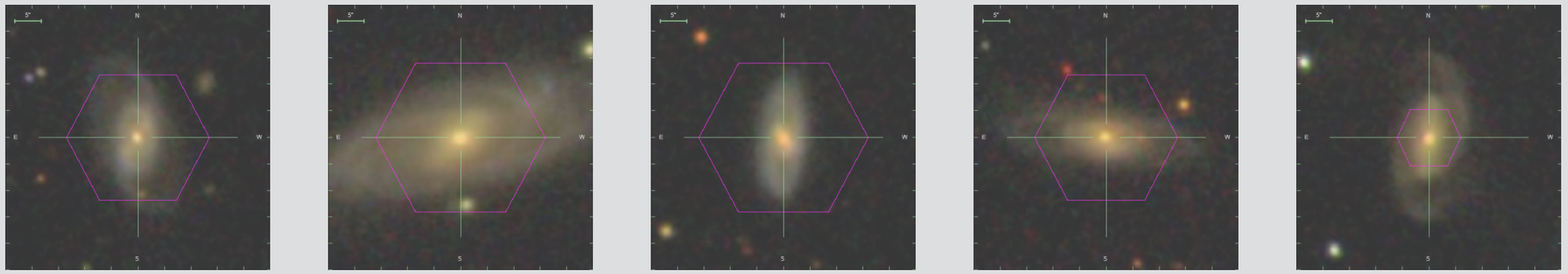
Surprising high fraction of S0 : mergers?

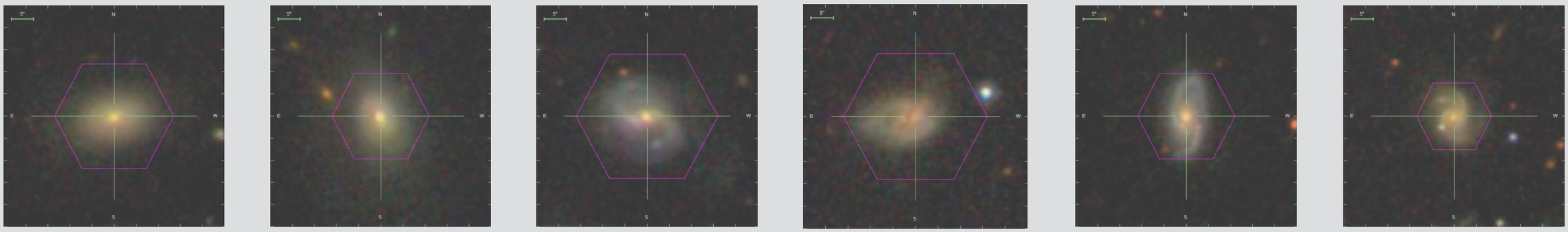
MaNGA data mining: using the DAP, 2D maps show standard velocity fields

Double-peaked features fitting: one μ, one σ for all lines

How does the emission line maps look based on the double-gaussian fits?
What are we going to learn from molecular gas observations?

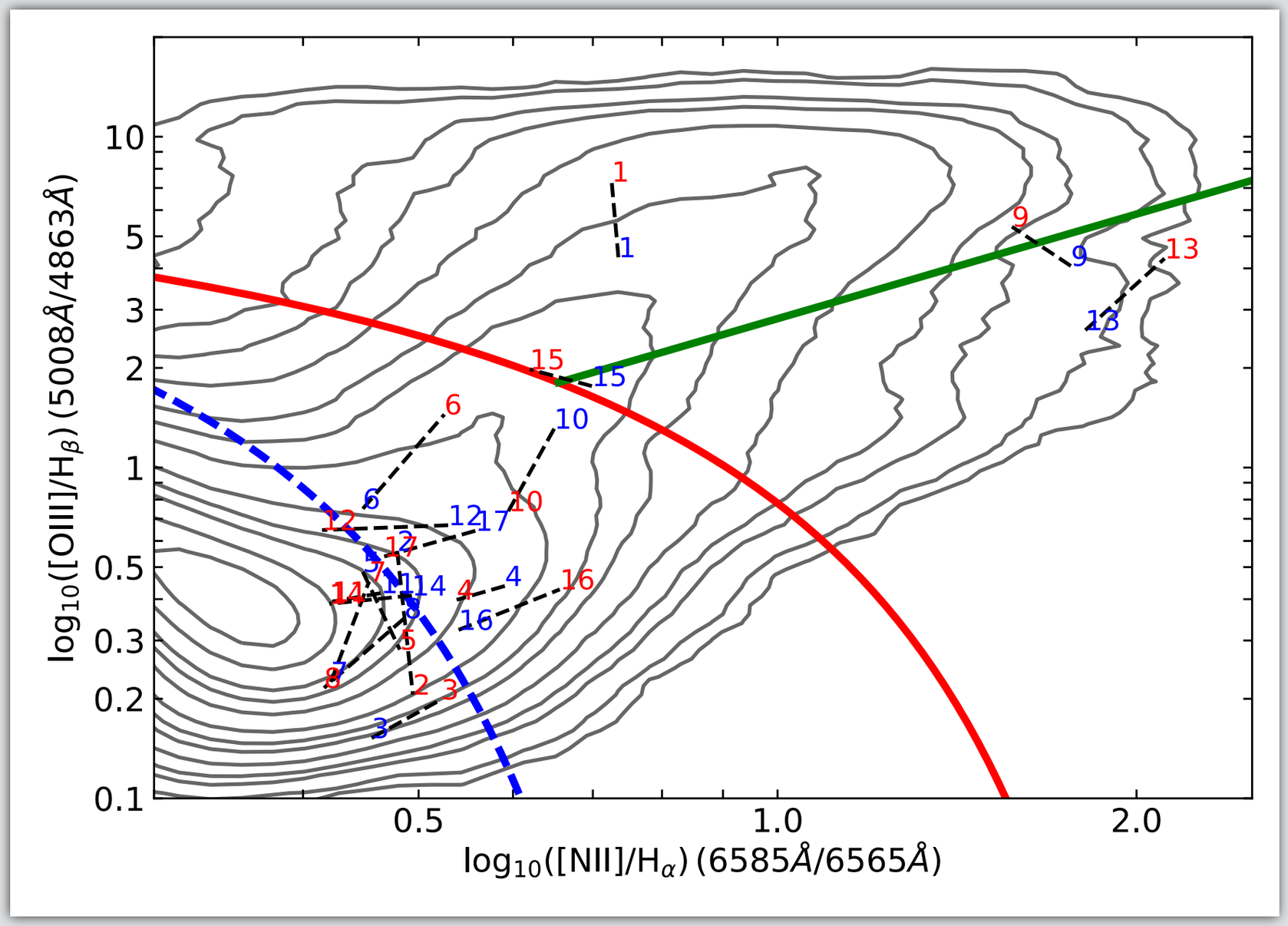


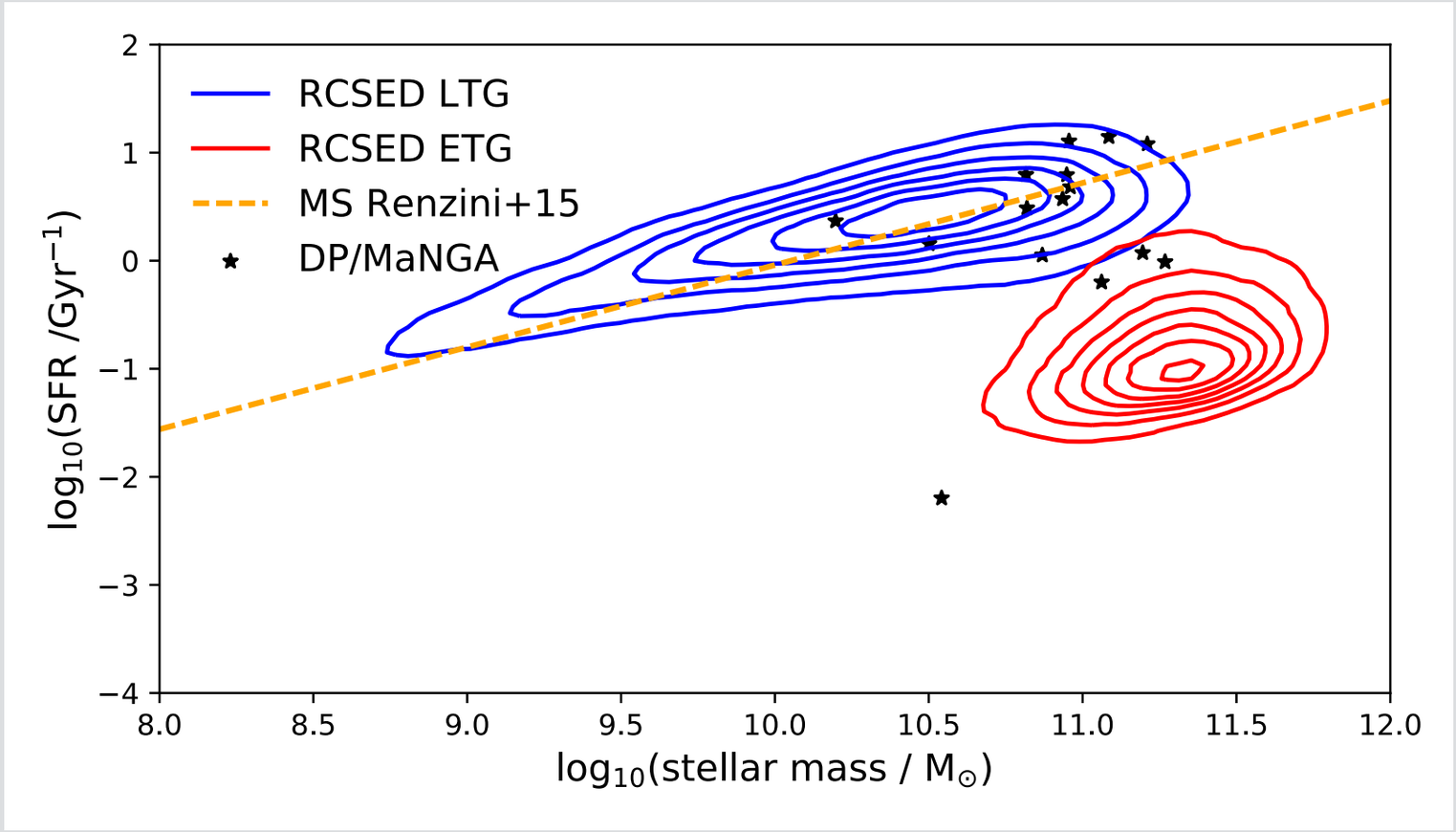


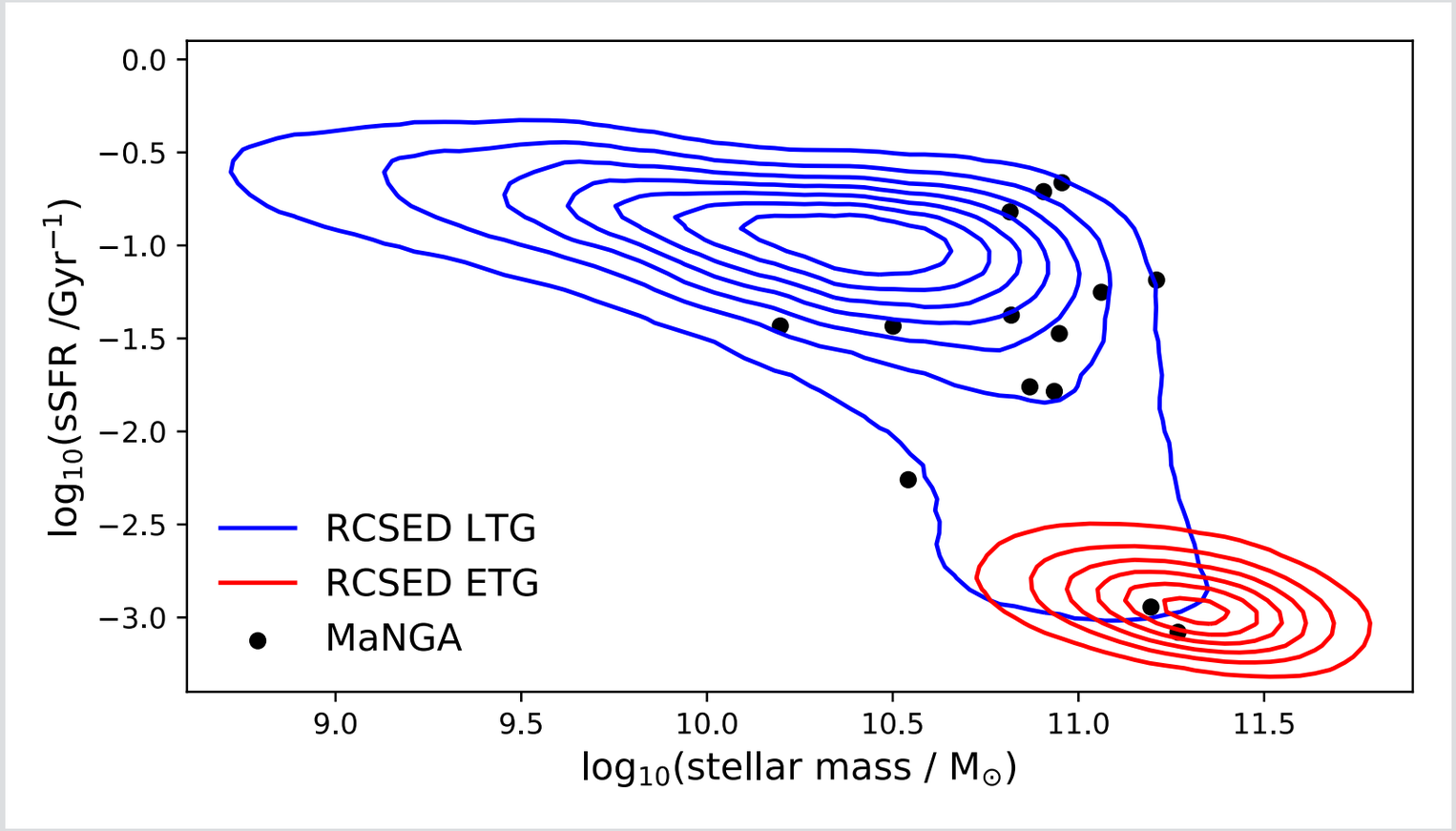


Thank you for your attention

Sample classification based on SDSS spectra




RCSED LTG
RCSED ETG
MS Renzini+15
DP/MaNGA
log10(SFR /Gyr−1)
log10(stellar mass / M⊙)
2
1
0
−1
−2
−3
−4
8.0
8.5
9.0
9.5
10.0
10.5
11.0
11.5
12.0


RCSED LTG
RCSED ETG
MaNGA
log10(sSFR /Gyr−1)
log10(stellar mass / M⊙)
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
9.0
9.5
10.0
10.5
11.0
11.5