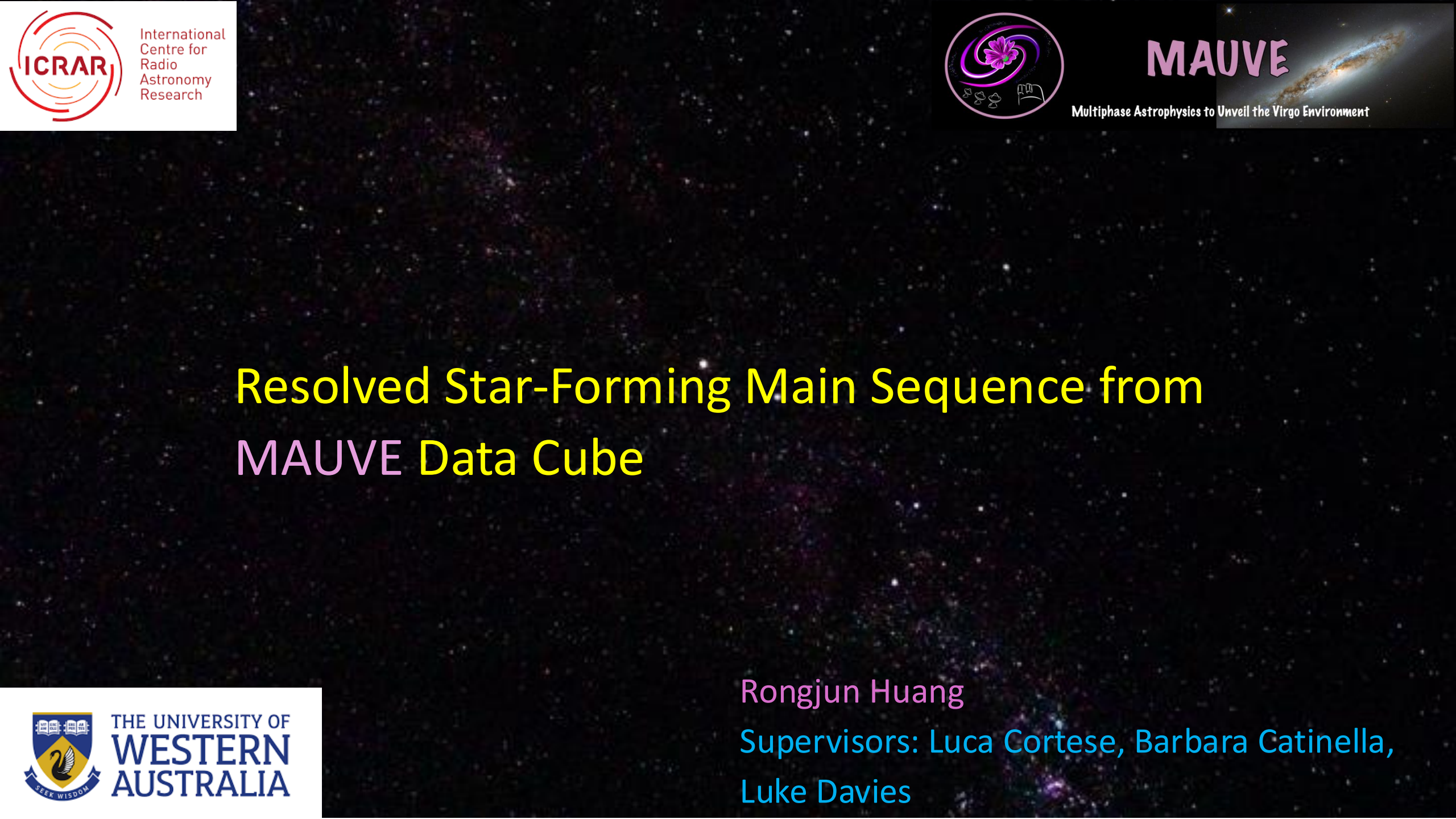


Resolved Star-Forming Main Sequence from MAUVE Data Cube

Rongjun Huang
Supervisors: Luca Cortese, Barbara Catinella, Luke Davies

THE UNIVERSITY OF WESTERN AUSTRALIA

1. Introduction
What is Star-Forming Main Sequence (SFMS)?

Galaxy main sequence (MS):

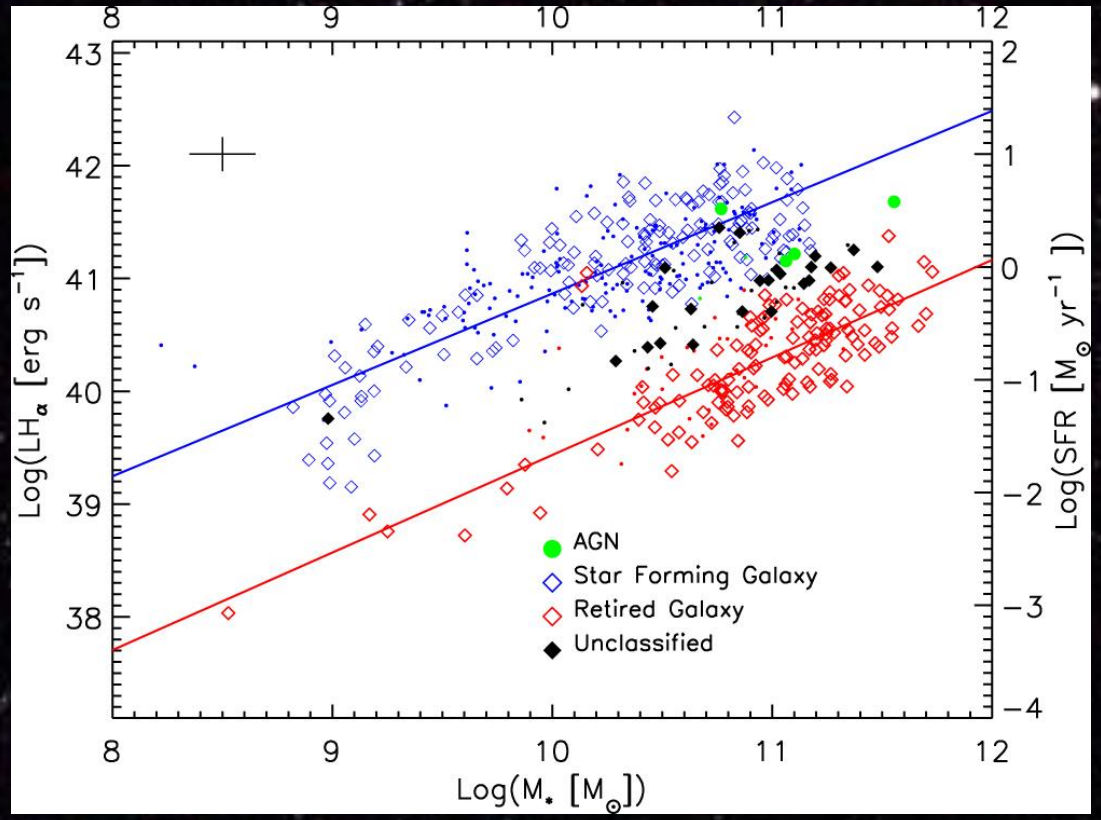
Star Formation Rate (SFR) vs Stellar Mass (M_*)

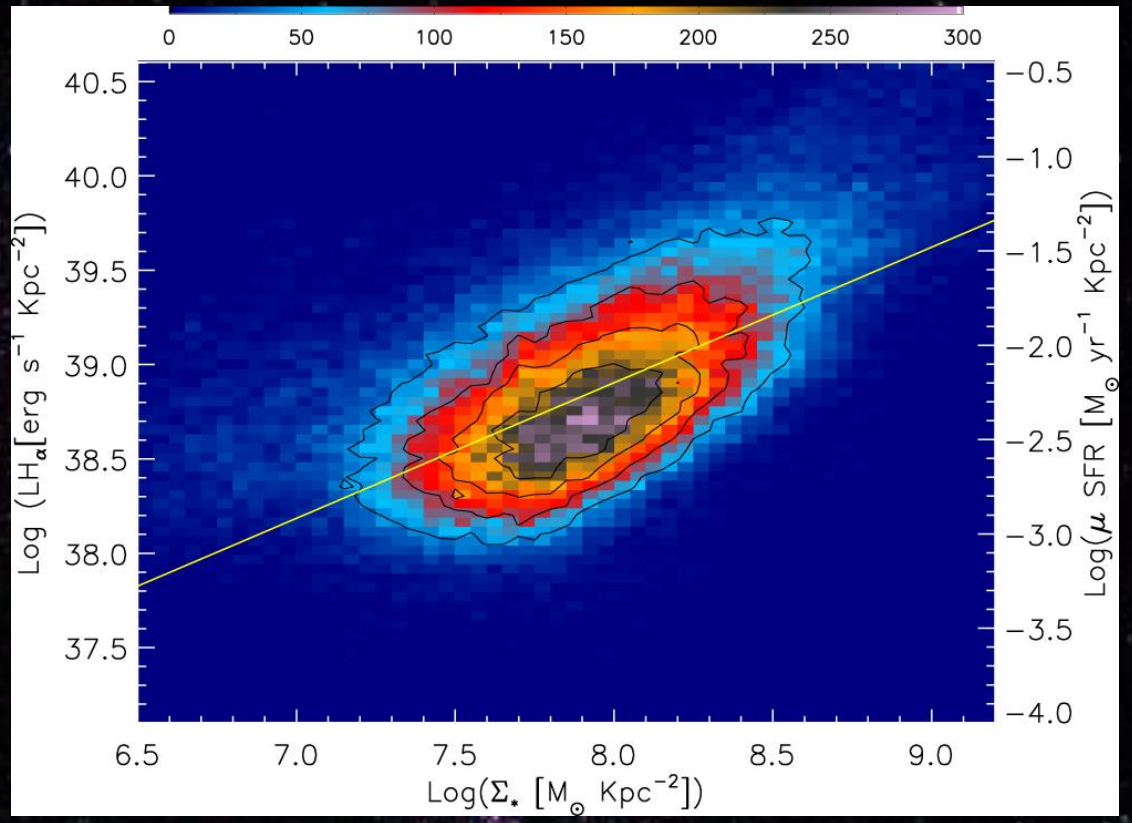
Credit: Astrobites

1. Introduction
What is resolved Star-Forming Main Sequence (rSFMS)?

From global SFMS to local SFMS (or from integrated to spatially-resolved)

Recently explored by CALIFA (Cano-Díaz+2016), MaNGA (Hsieh+2017, Baker+2021), TNG100 (McDonough+2025)





Spatial resolution: ~1kpc

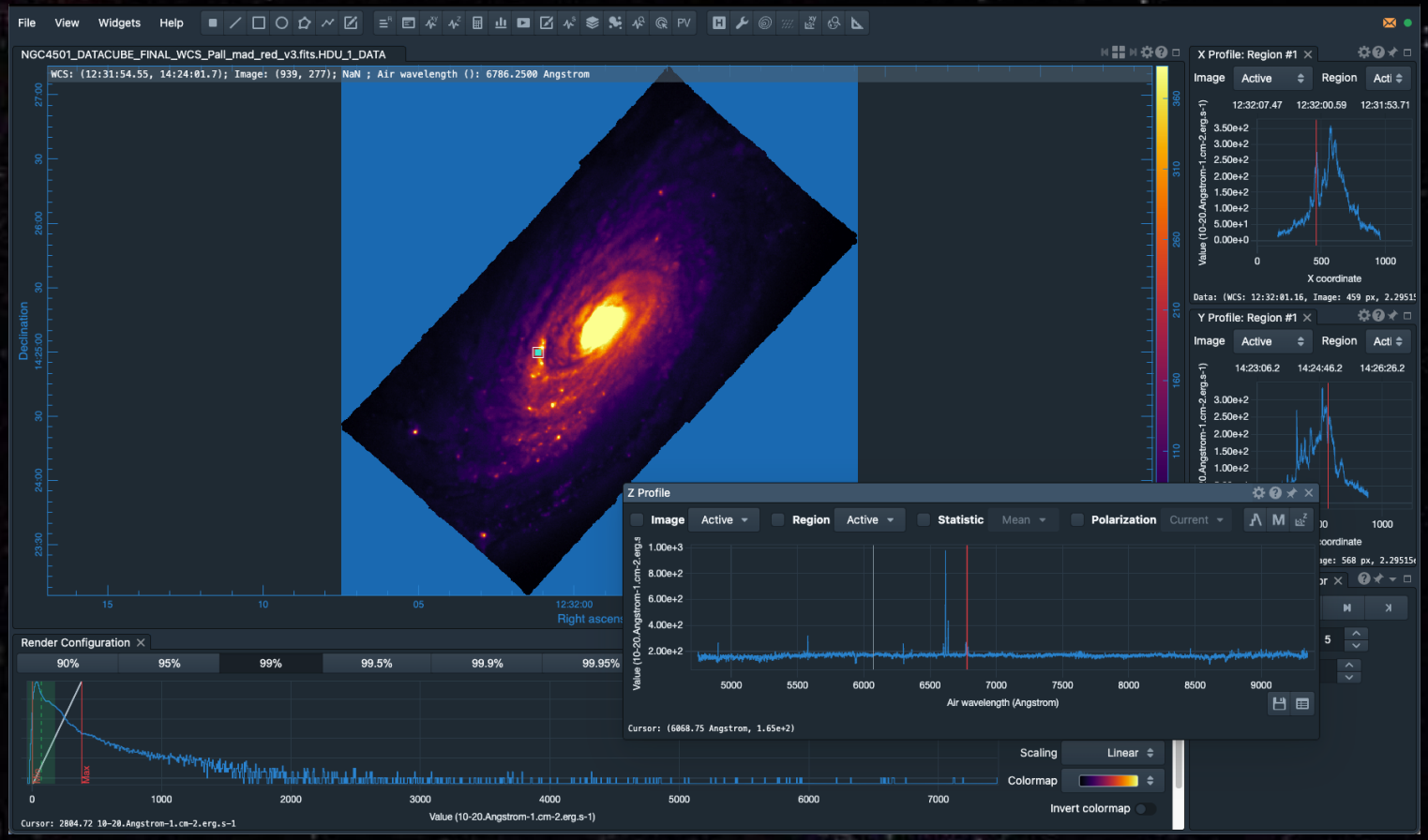
Cano-Díaz+2016

2. DATA – MAUVE Datacube

40 late-type Virgo cluster galaxies at various infall stages using VLT/MUSE

Spatial resolution: ~100pc

e.g., NGC4501 (a.k.a., M88) ---------->

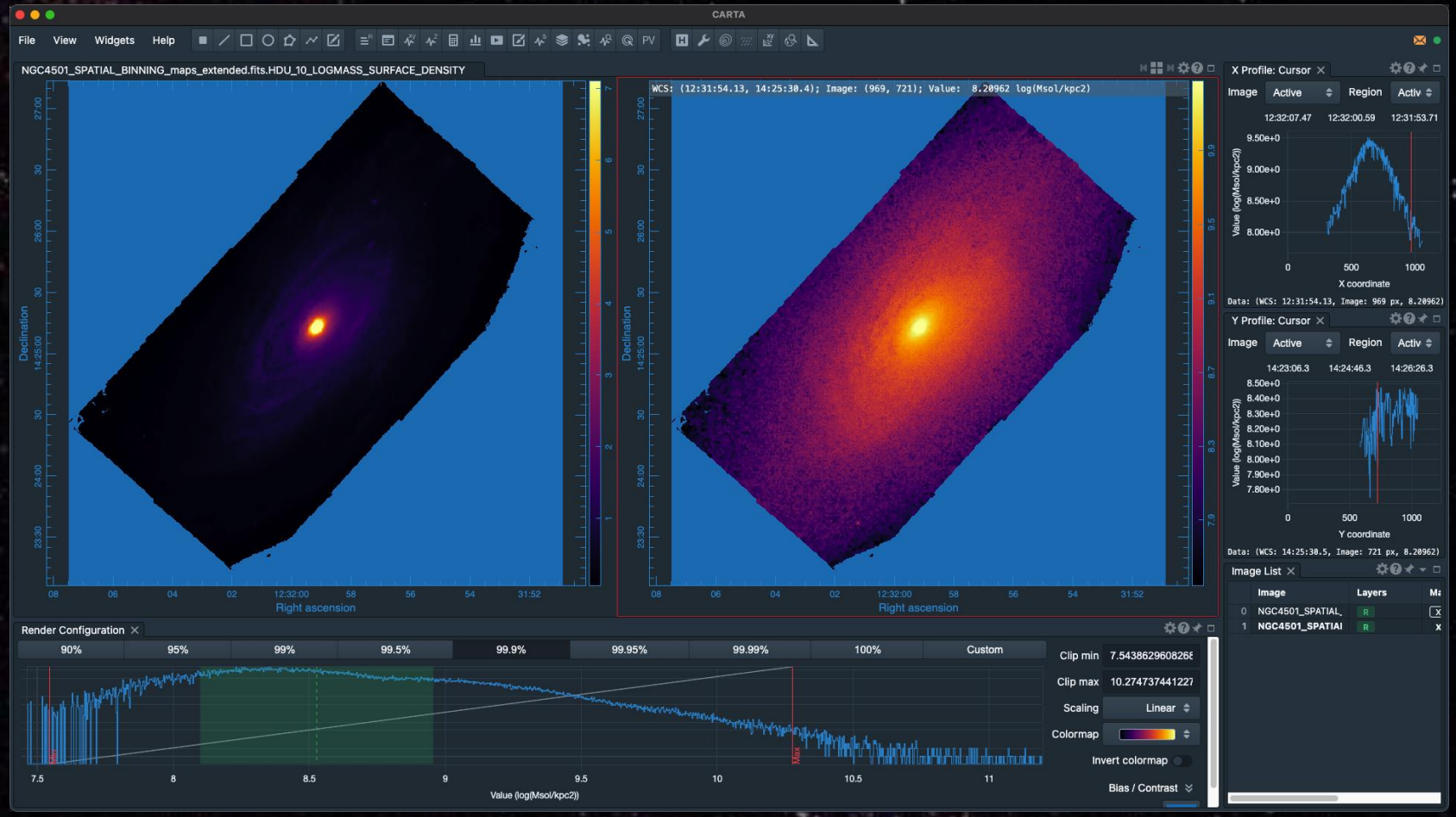


3. Method – Stellar Mass (surface density) Map

Take stellar continuum from Datacube

Extract corrected R-band Luminoisty

Get stellar mass (surface density) map



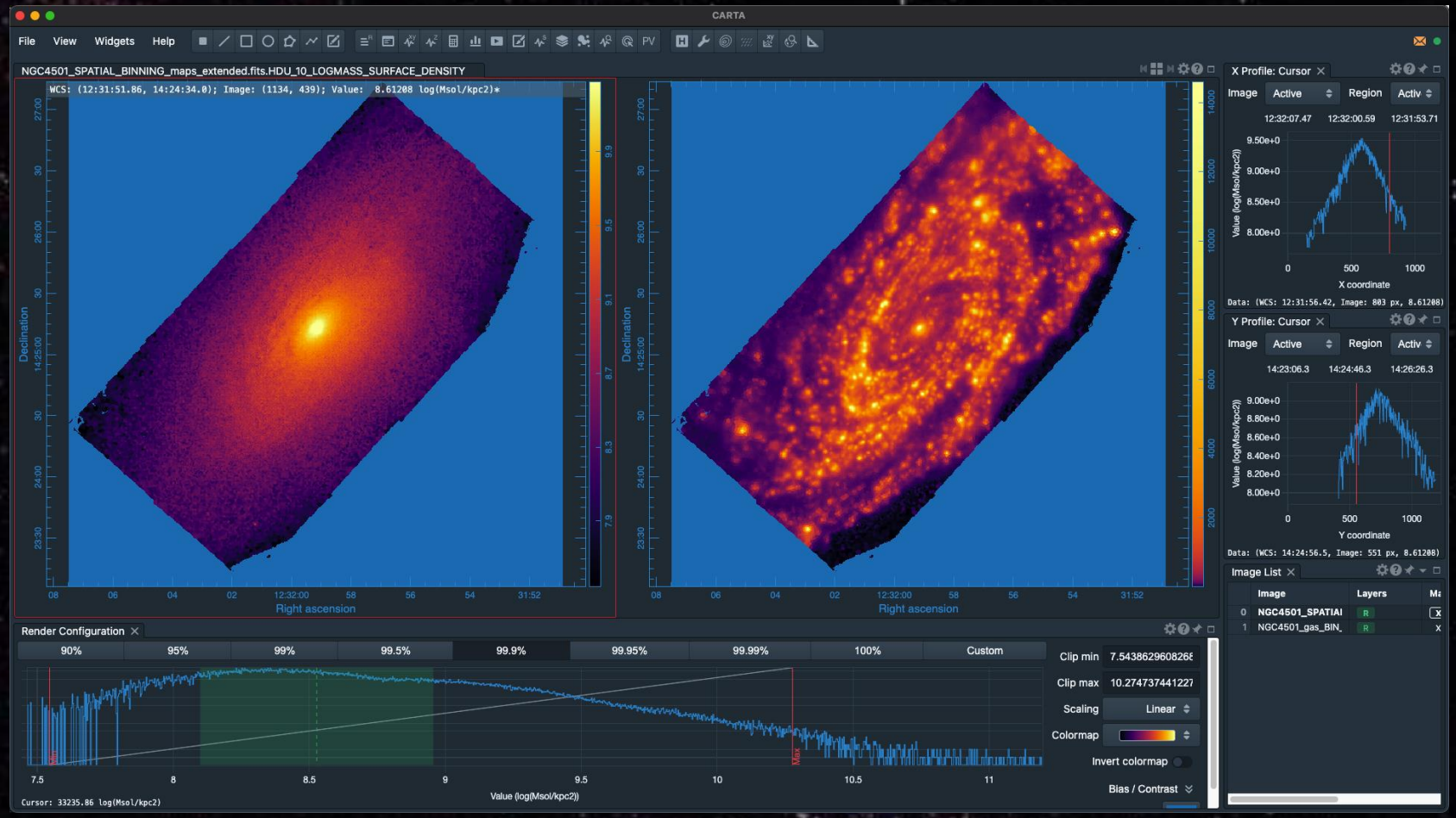
Left: corrected R-band Luminoisty; Right: stellar mass (surface density) map

3. Method – SFR (surface density) Map

Take Halpha flux from Datacube

Corrected by Balmer Decrement

Get SFR (surface density) map by SFR calibration (Calzetti+2007)



Left: stellar mass (surface density) map; Right: SFR (surface density) map

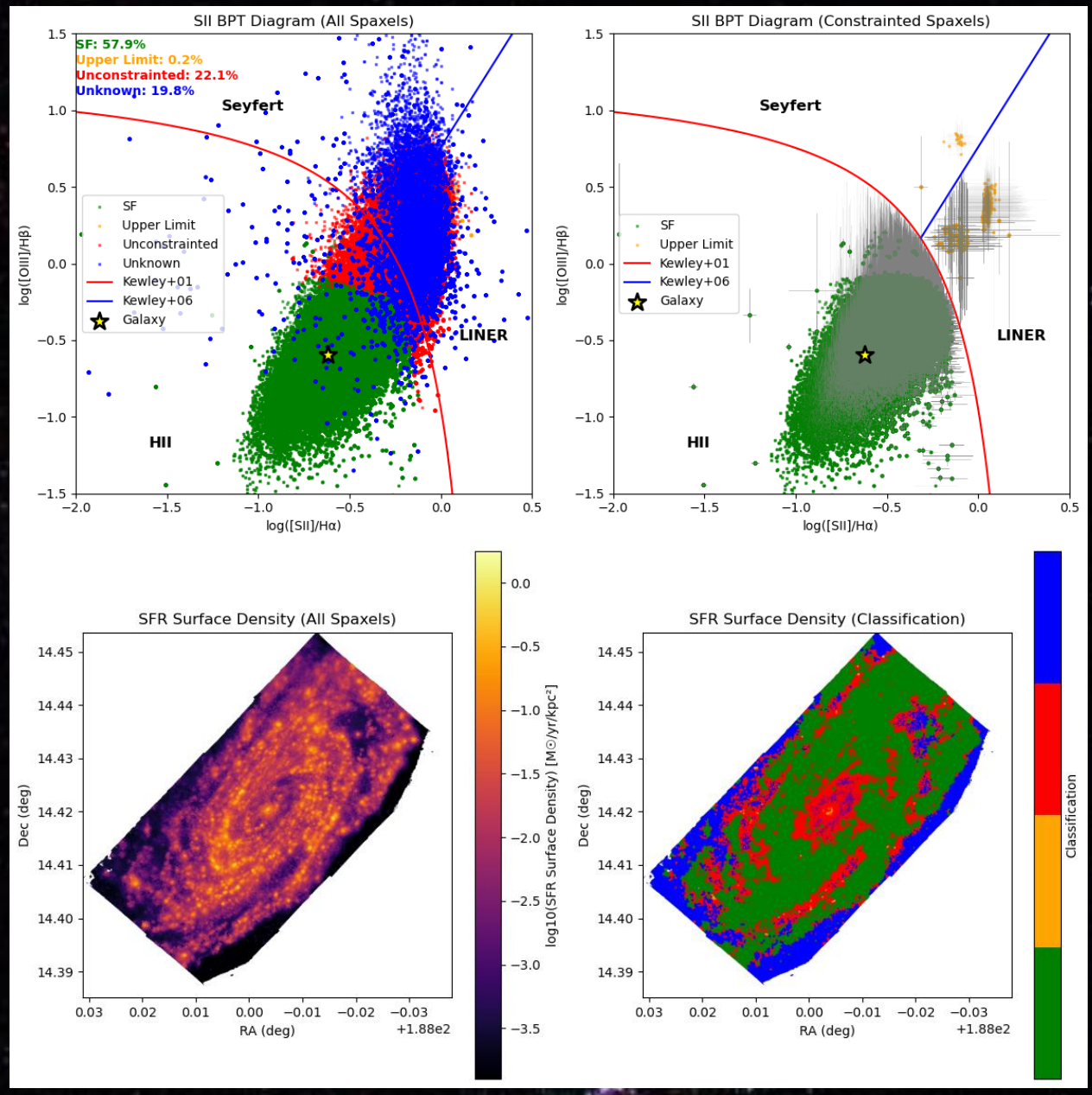
3. Method – Classification on BPT

SF: Star-Forming region, dominated by O/B stars photonization

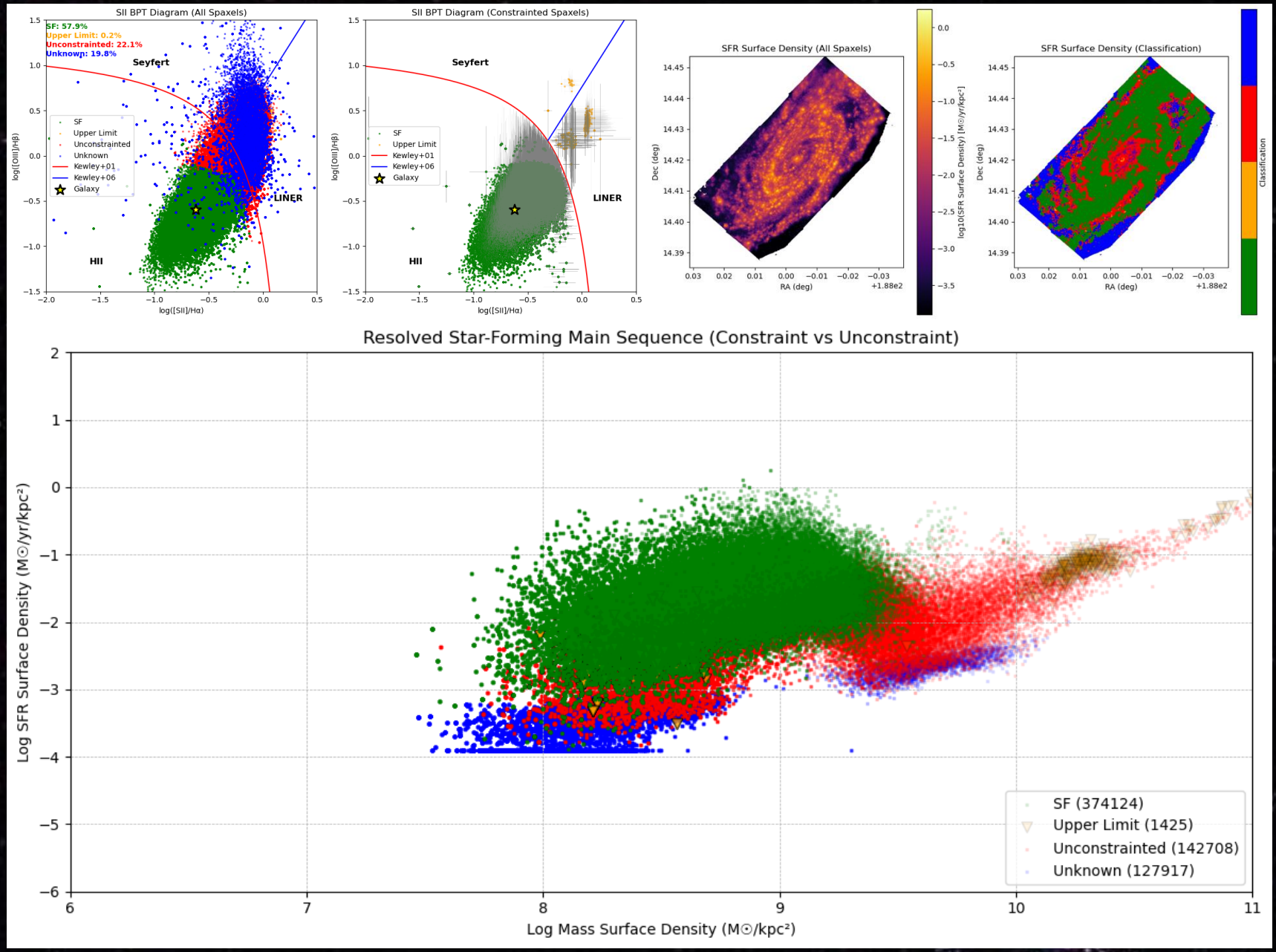
Upper Limit: not dominated by Star Formation

Unconstrainted: errorbars are too large to be classified

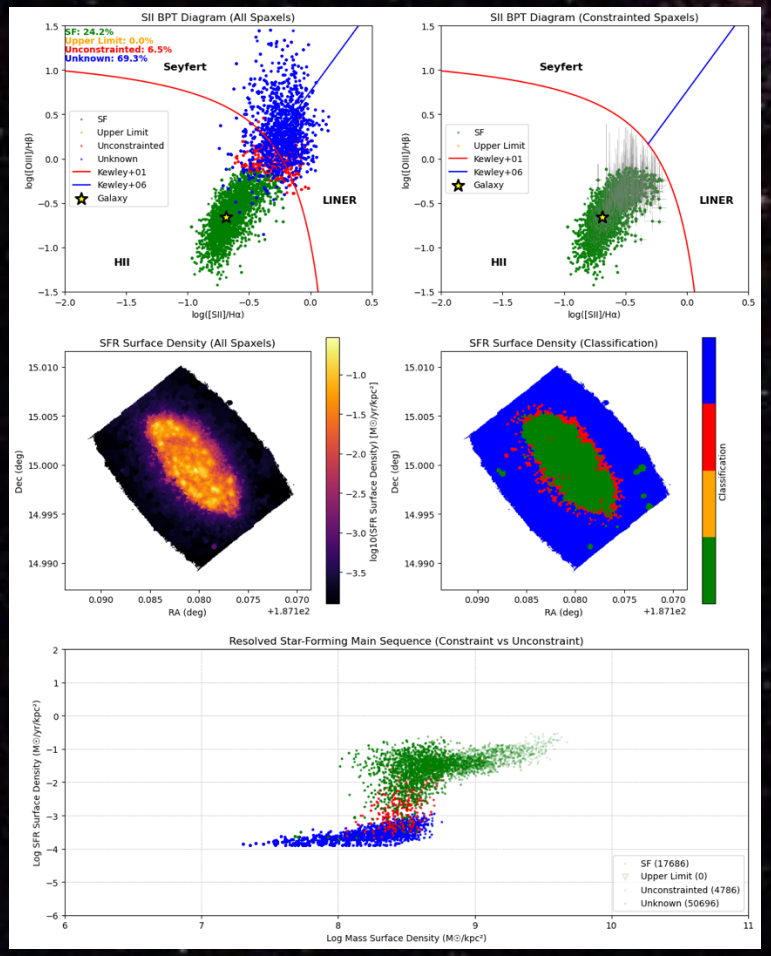
Unknow: week detection in Halpha and/or Hbeta line



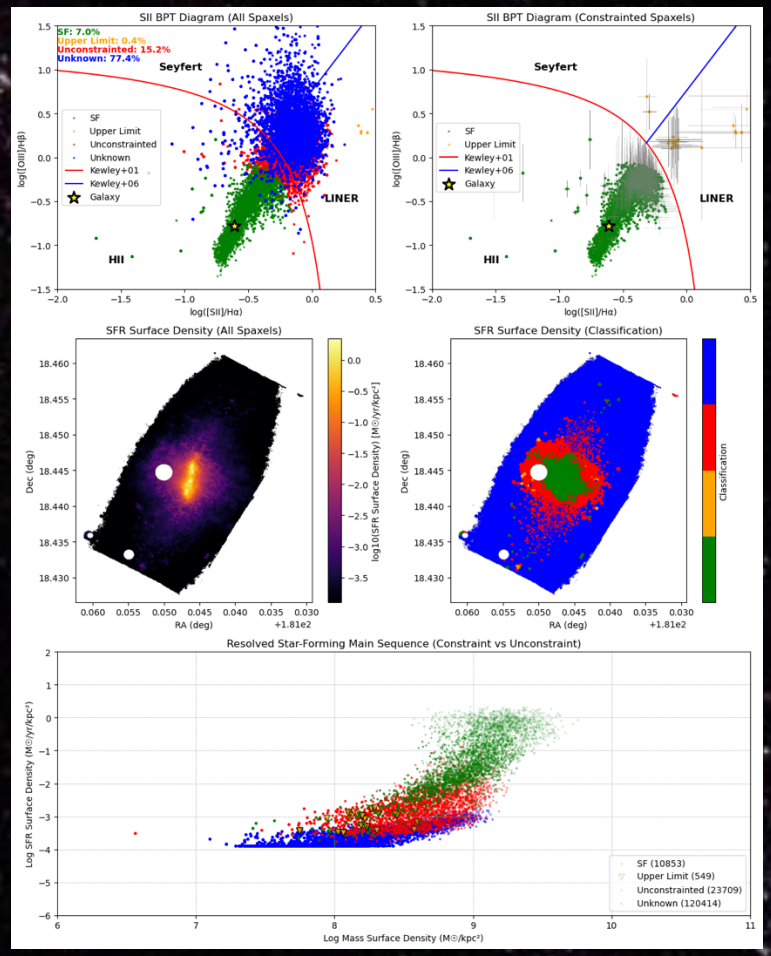
4. Result – rSFMS



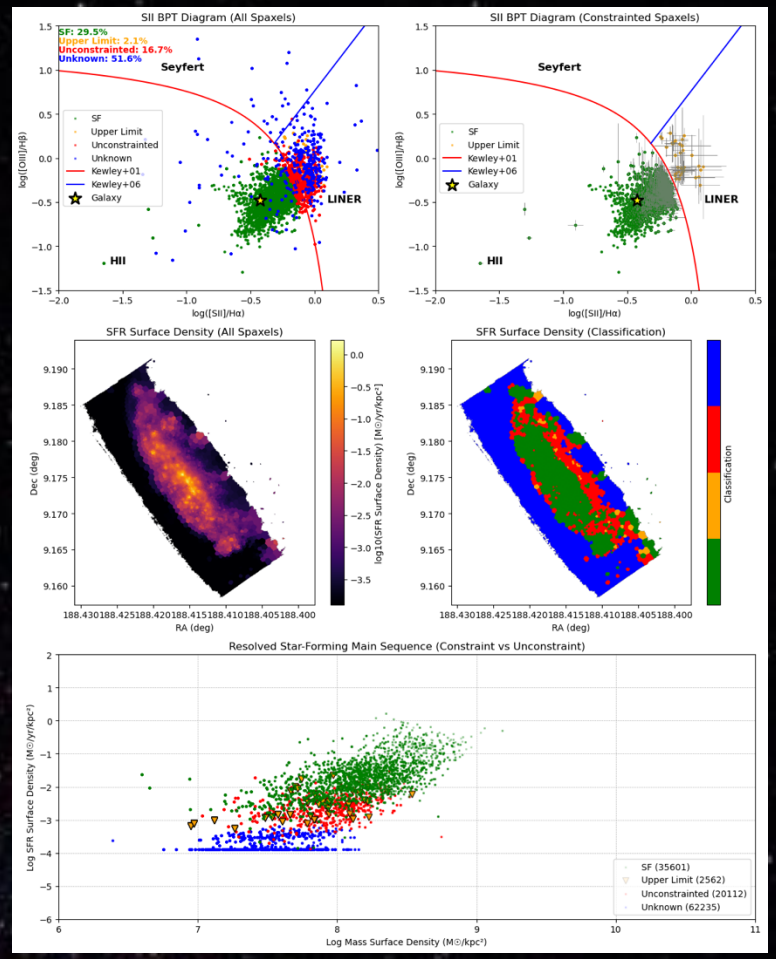
4. Result – rSFMS



IC3392: Star-Forming galaxy



NGC4064: ‘Backsplash’ galaxy with starburst outflow

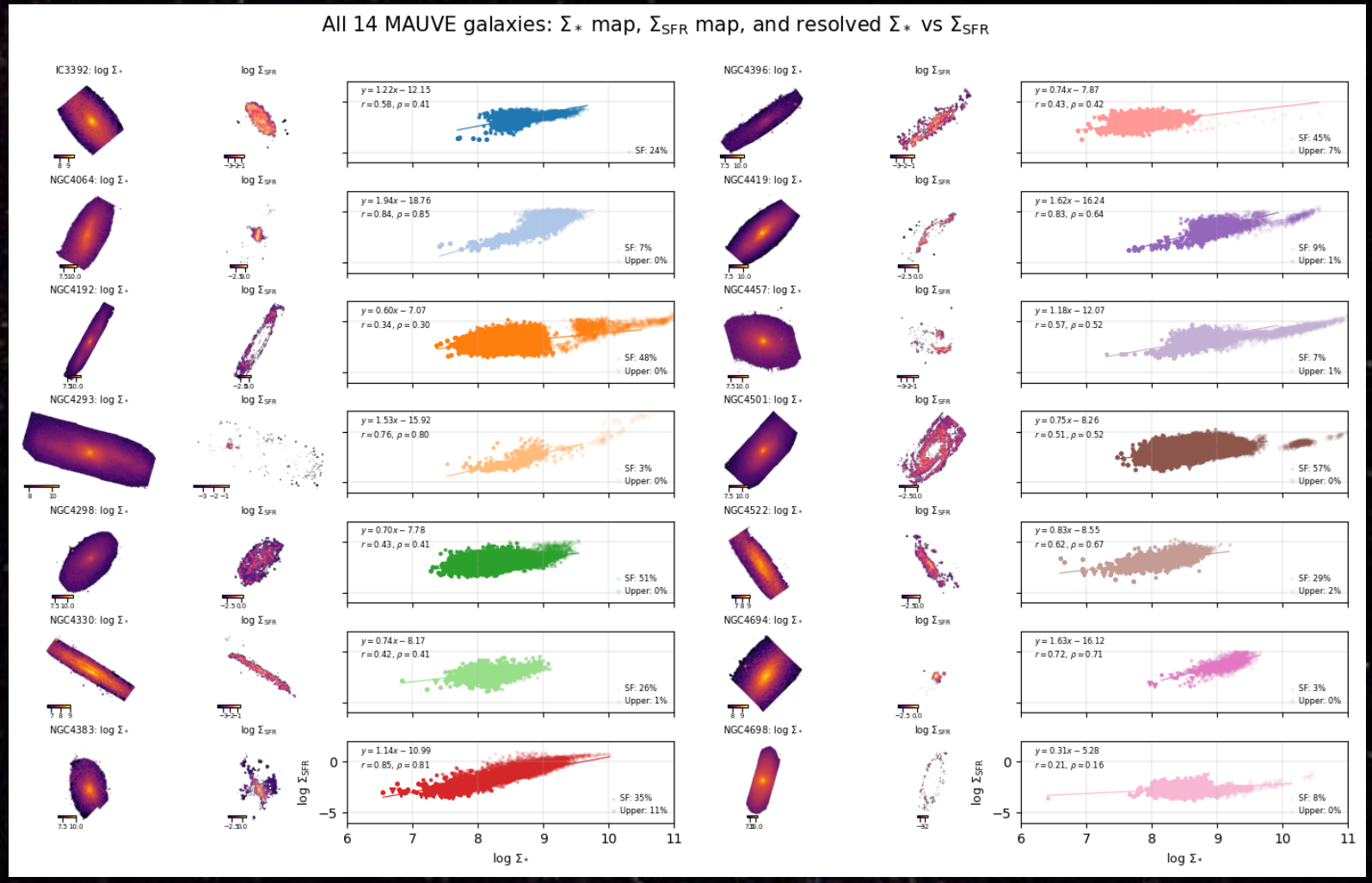


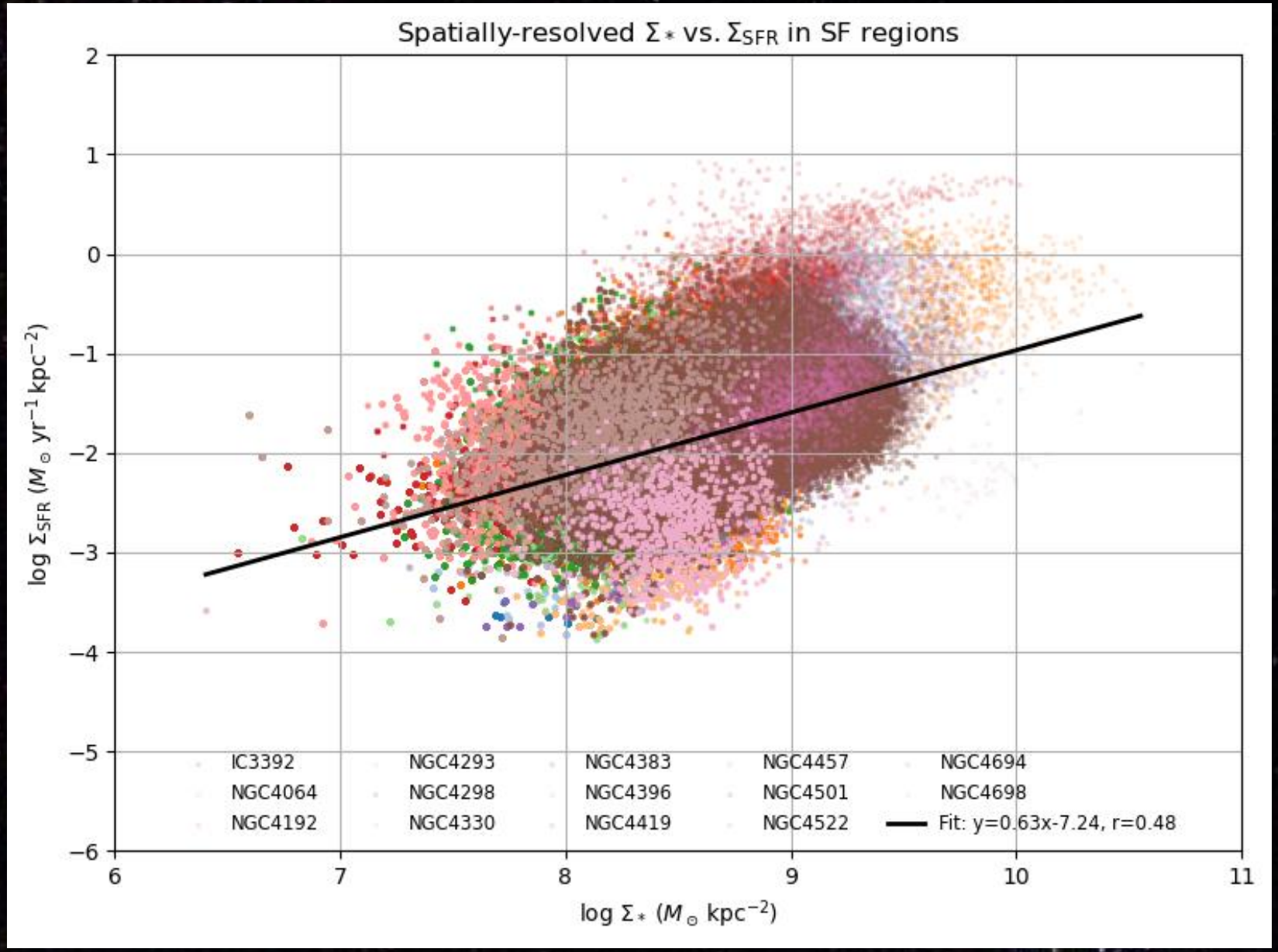
NGC4330: Ram pressure stripping galaxy

5. Take away

1. Spatial resolution - rSFMS at 100pc scale – star formation down to GMC scale

2. Environment changes the shape of rSFMS




Spatially-resolved Σ∗ vs. ΣSFR in SF regions
log ΣSFR (M⊙ yr−1 kpc−2)
log Σ∗ (M⊙ kpc−2)
2
1
0
−1
−2
−3
−4
−5
−6
6
7
8
9
10
11
IC3392
NGC4064
NGC4192
NGC4293
NGC4298
NGC4330
NGC4383
NGC4396
NGC4419
NGC4457
NGC4501
NGC4522
NGC4694
NGC4698
Fit: y=0.63x-7.24, r=0.48