

EFFECTS OF DIFFUSE IONIZED GAS ON METALLICITY

Henry Poetrodjojo (ANU)

Brent Groves and Lisa Kewley

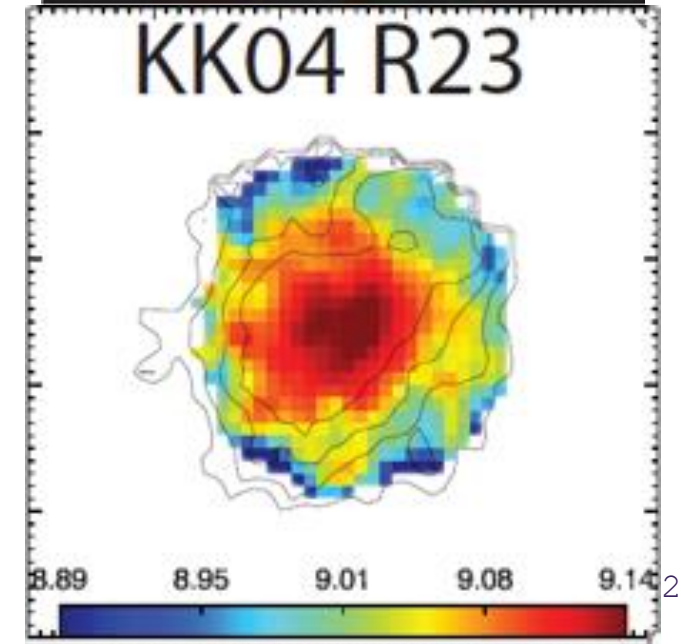
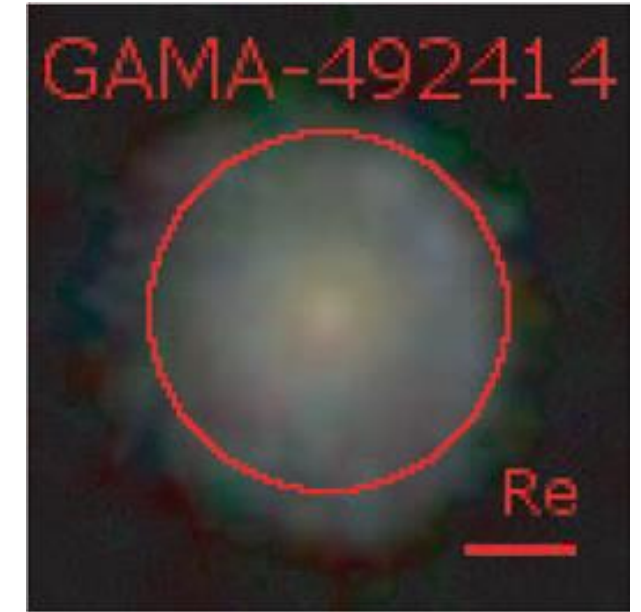
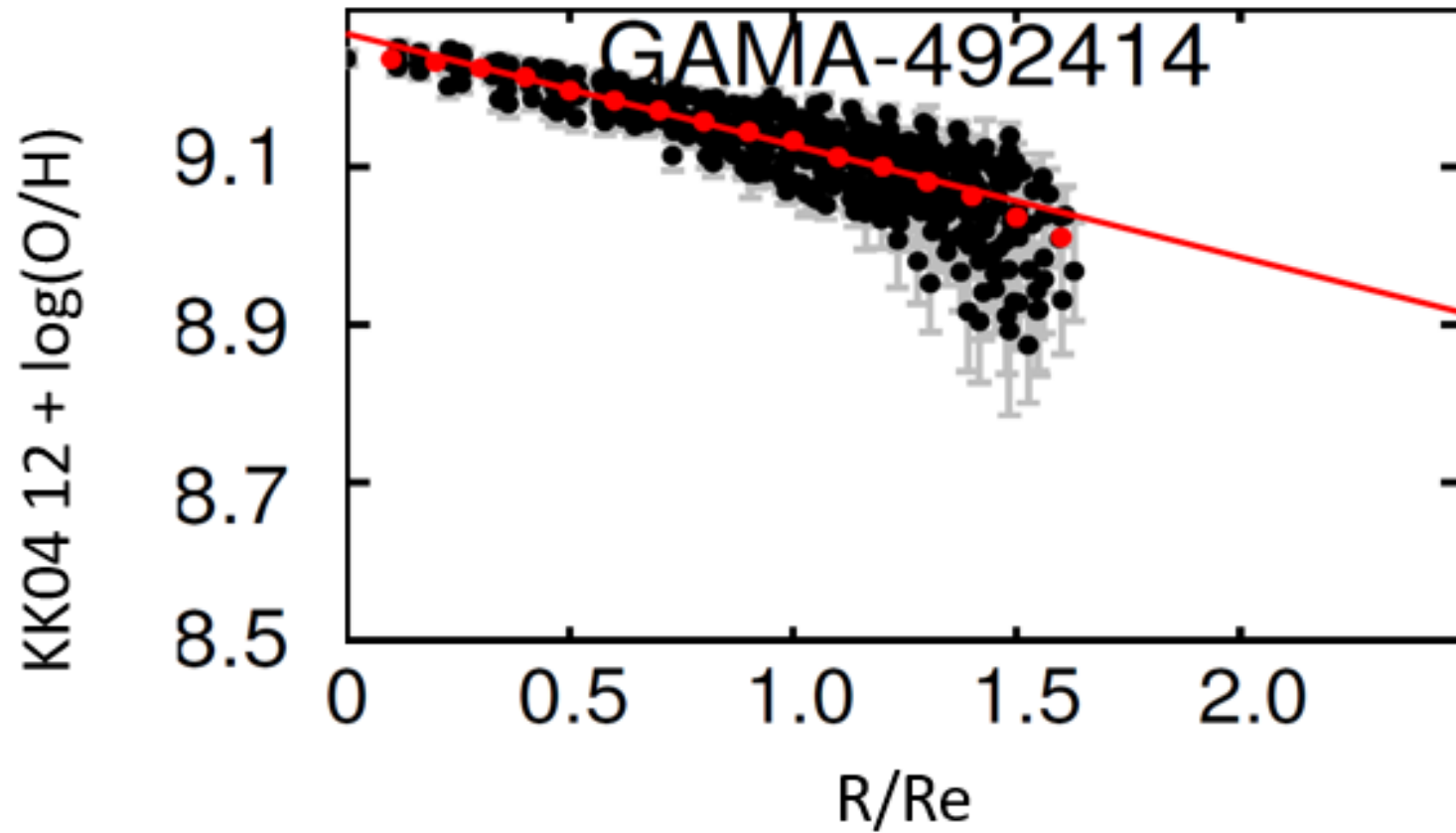


ASTRO 3D

**ARC CENTRE OF EXCELLENCE FOR
ALL SKY ASTROPHYSICS IN 3D**

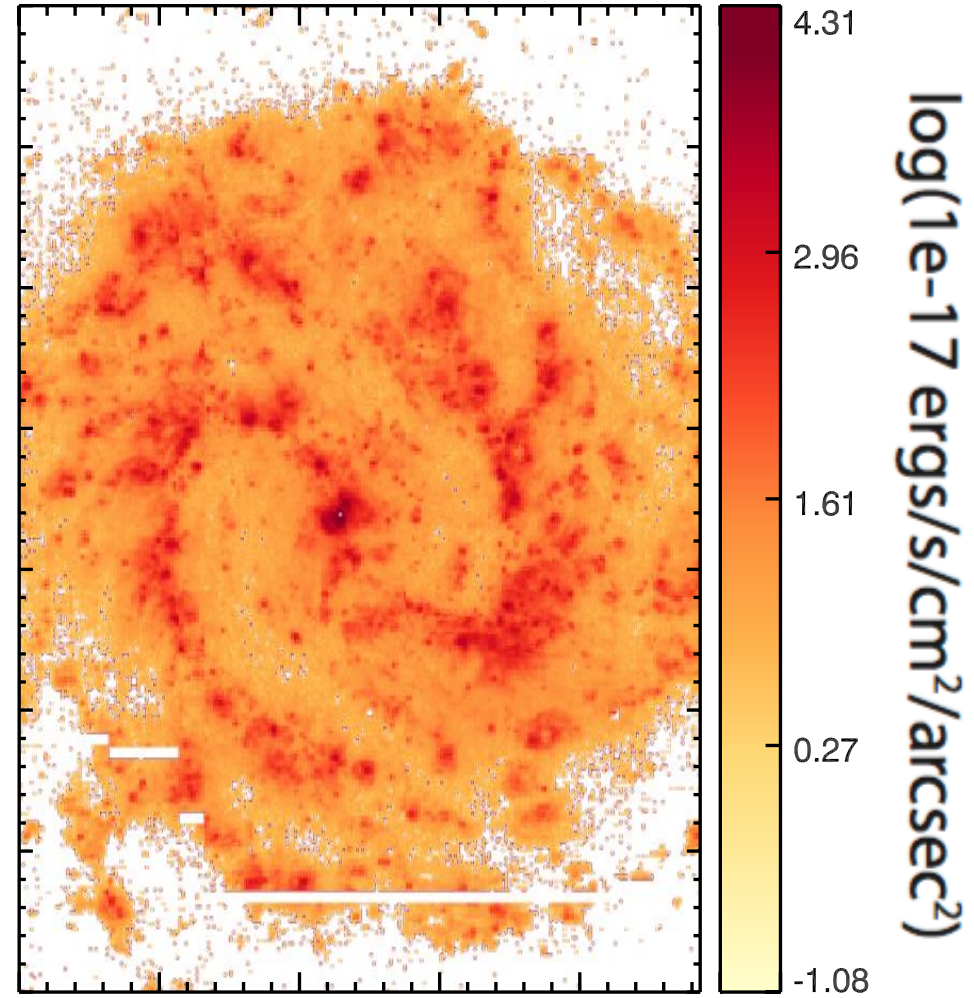
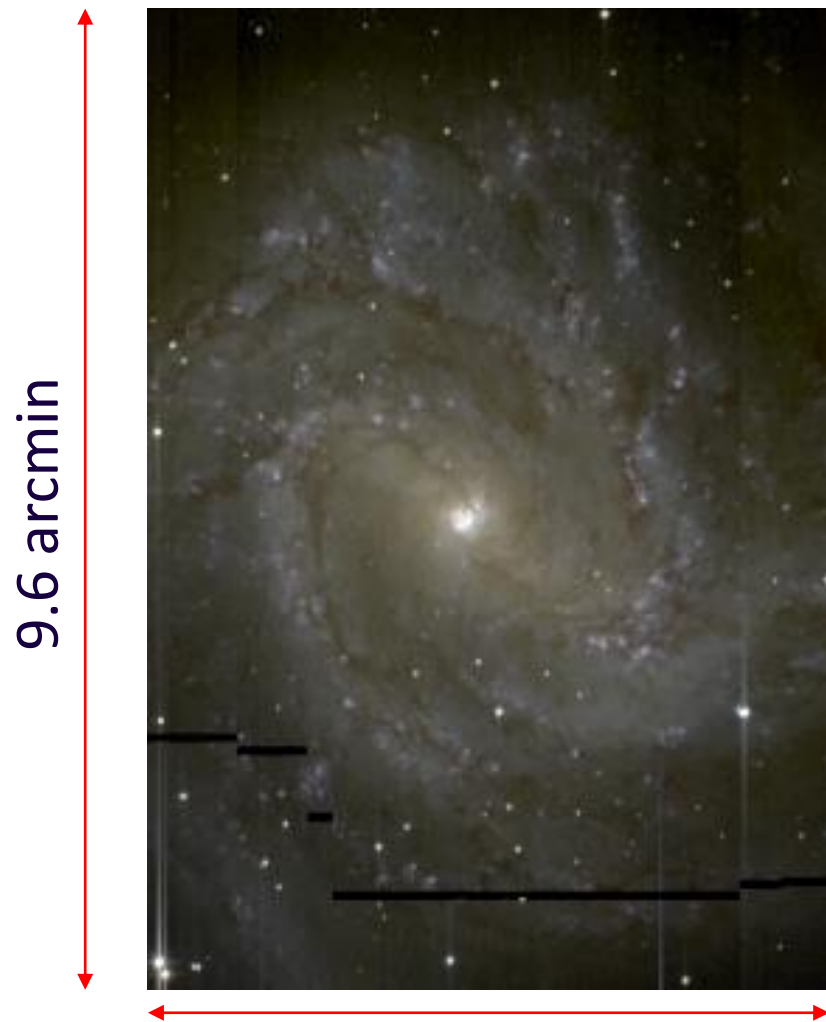
**UNLOCKING THE UNIVERSE,
INSPIRING THE FUTURE**

GAS-PHASE METALLICITY

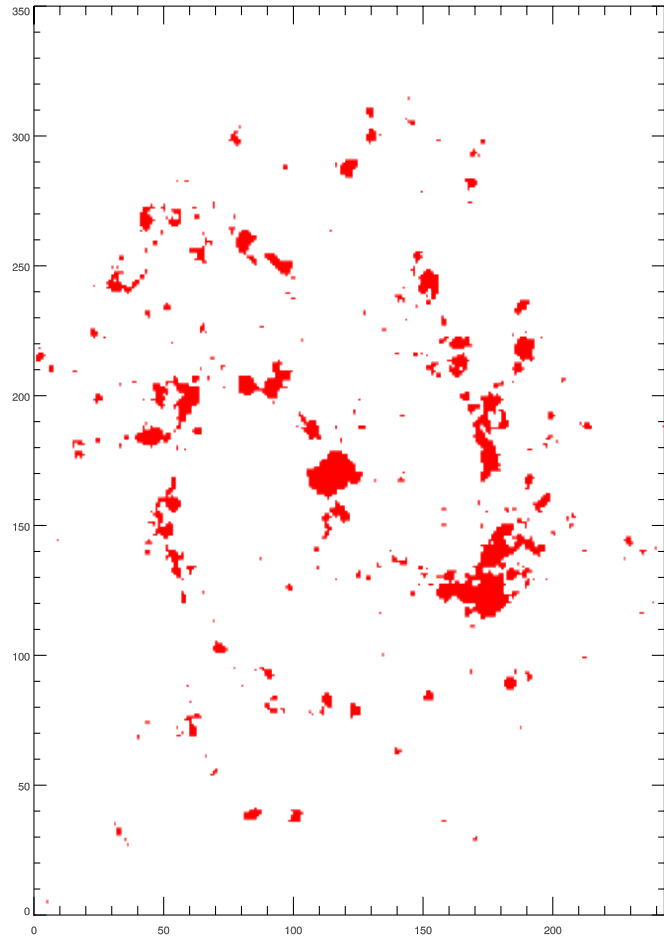


- emission line diagnostics assume emission originates from HII regions

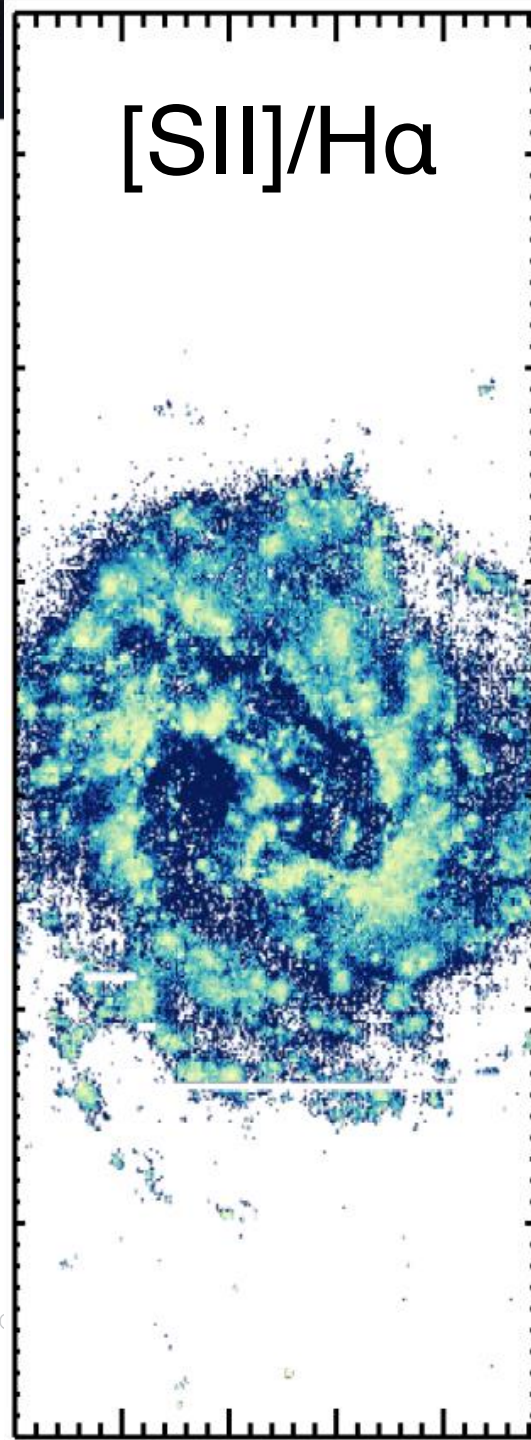
NGC5236/M83



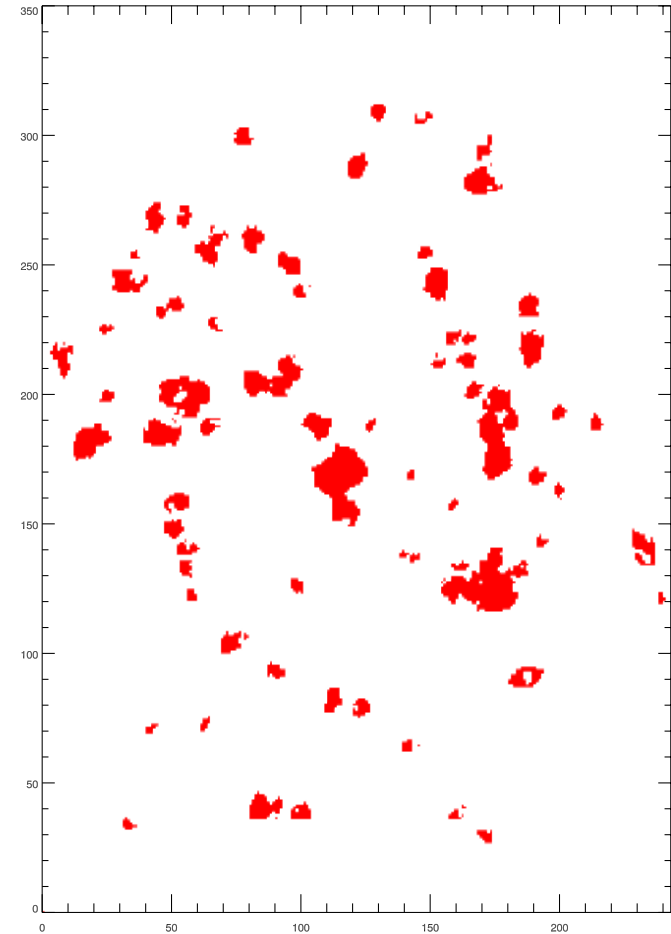
H α SB



[SII]/H α

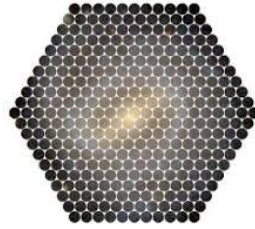


HIIPhot





41pc



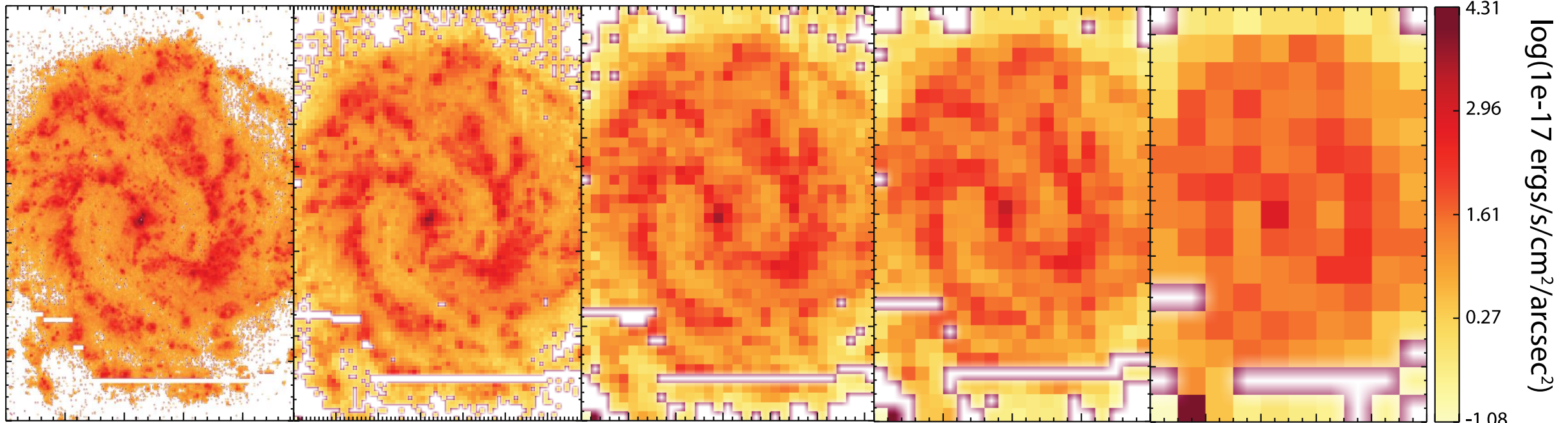
CALIFA Survey

330pc

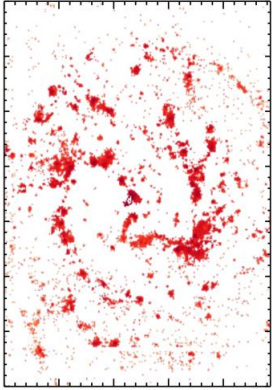


502pc

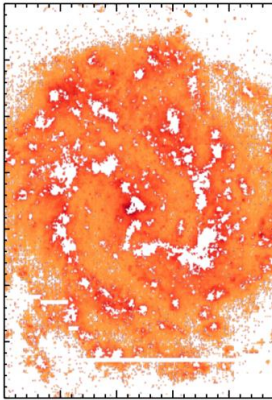
1005pc



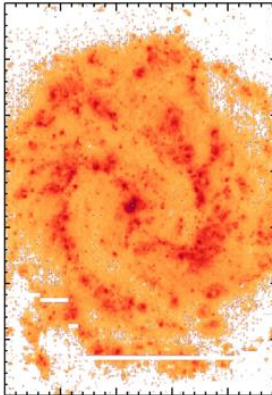
HII
Regions



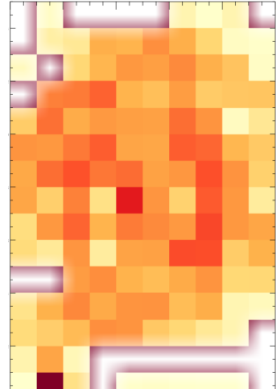
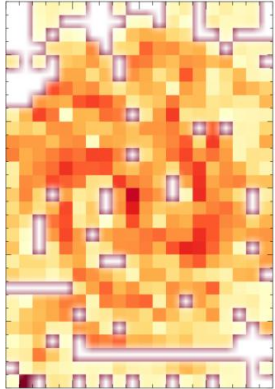
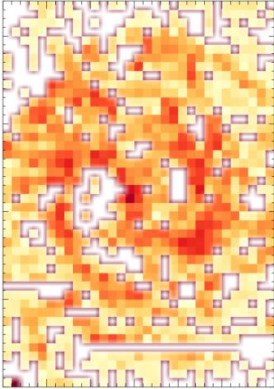
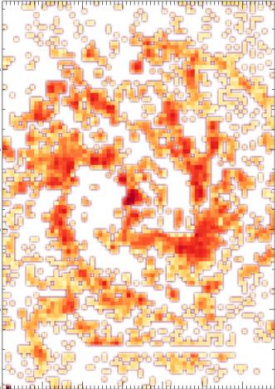
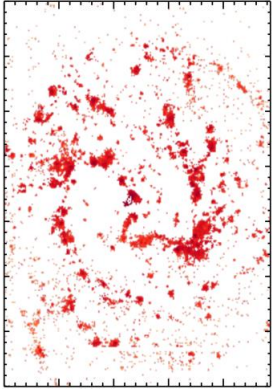
DIG
Regions



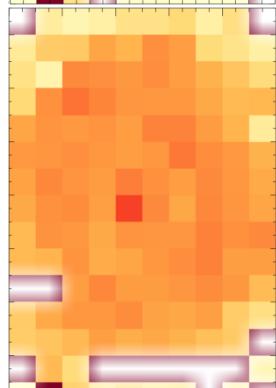
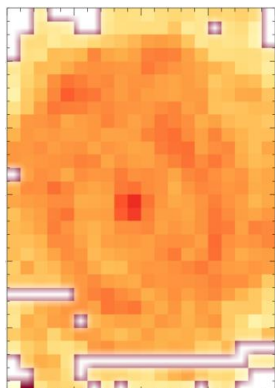
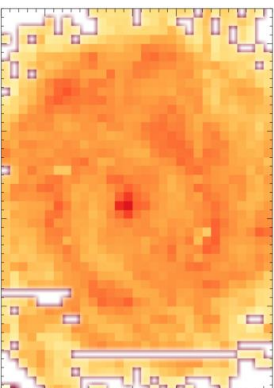
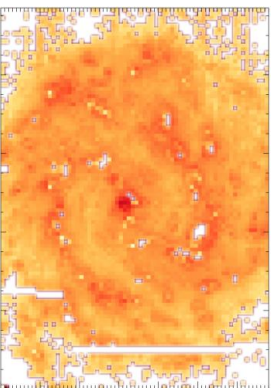
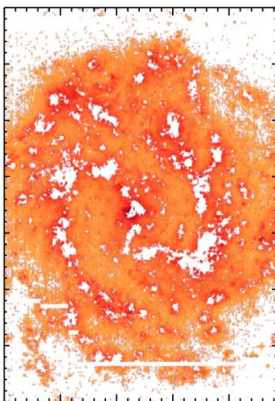
HII + DIG



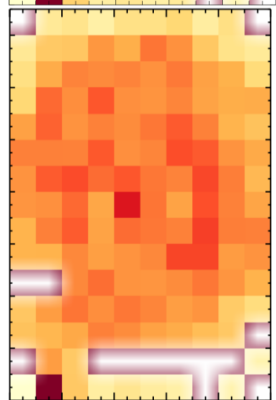
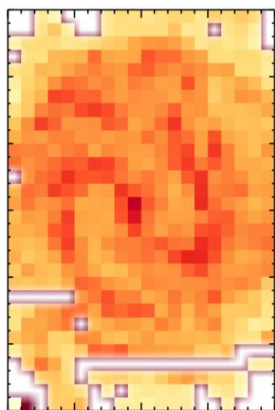
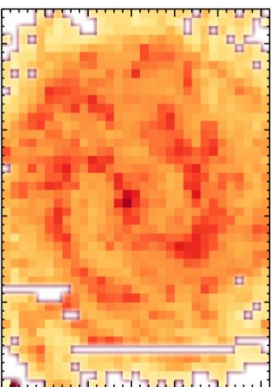
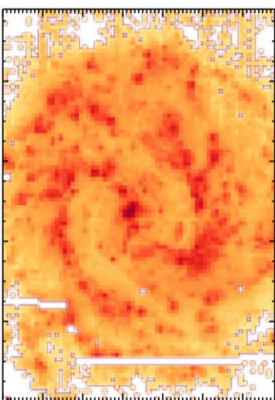
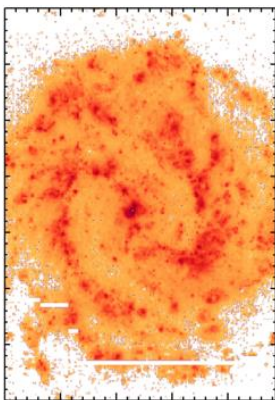
HII
Regions



DIG
Regions

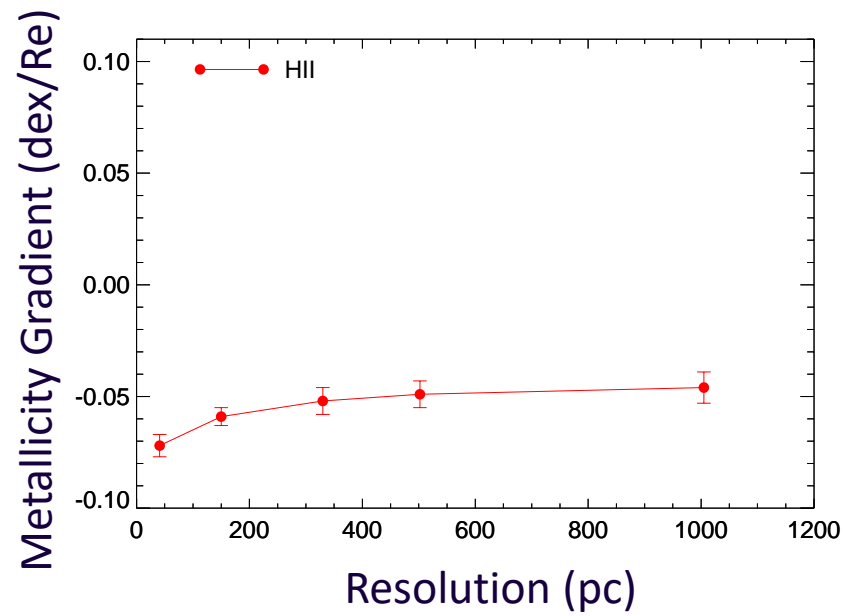
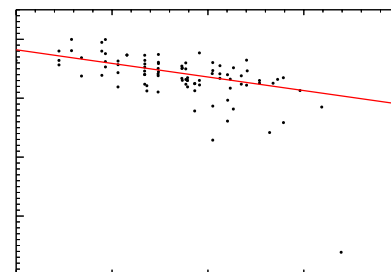
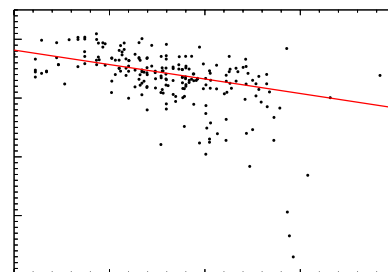
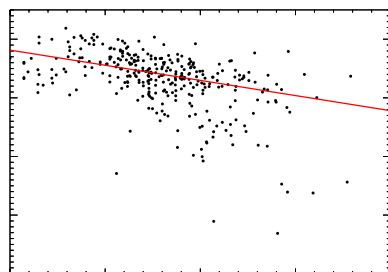
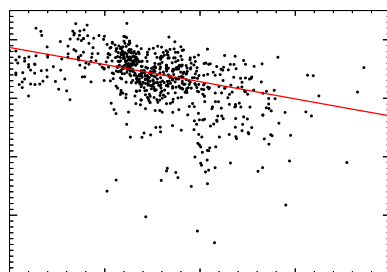
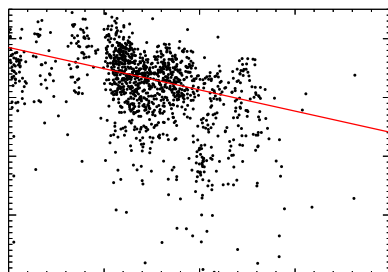
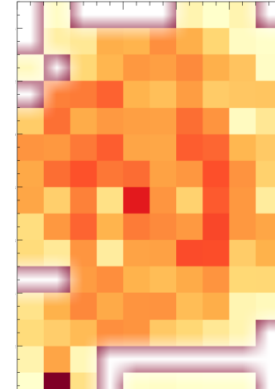
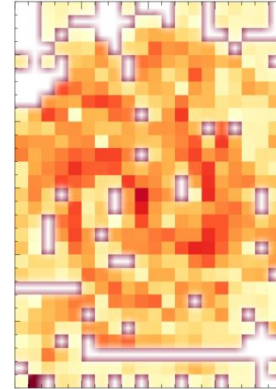
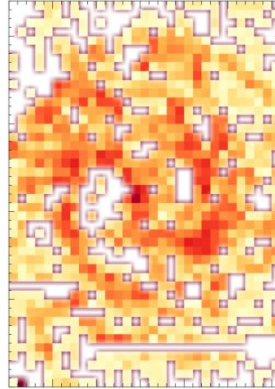
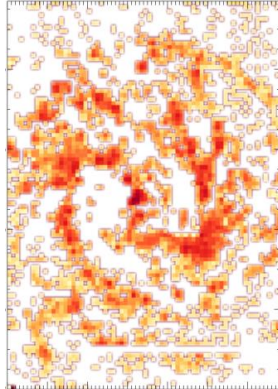
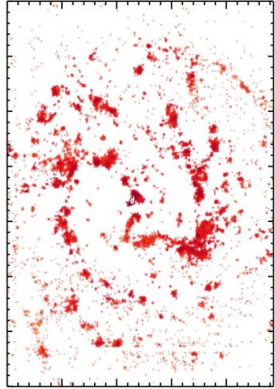


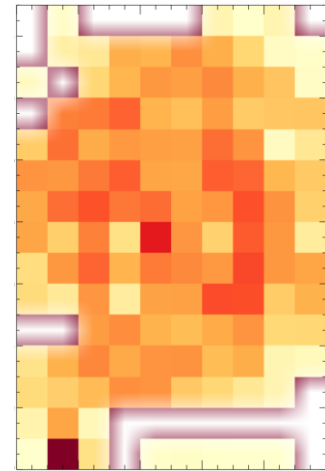
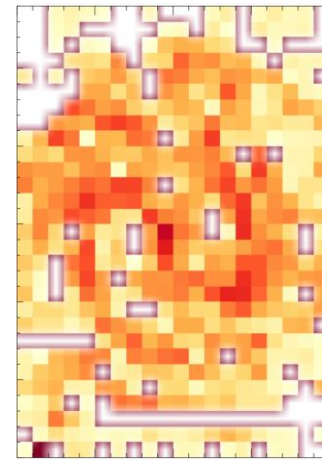
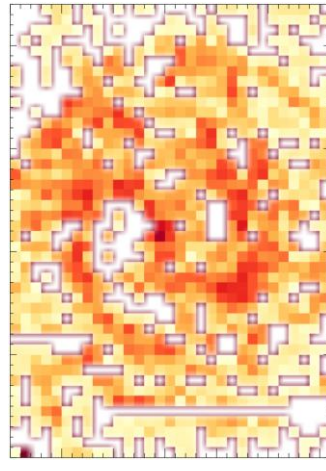
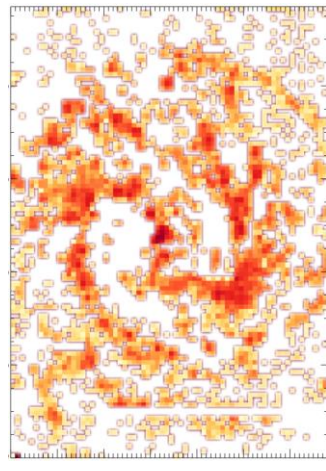
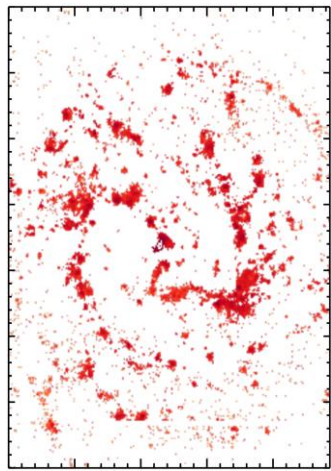
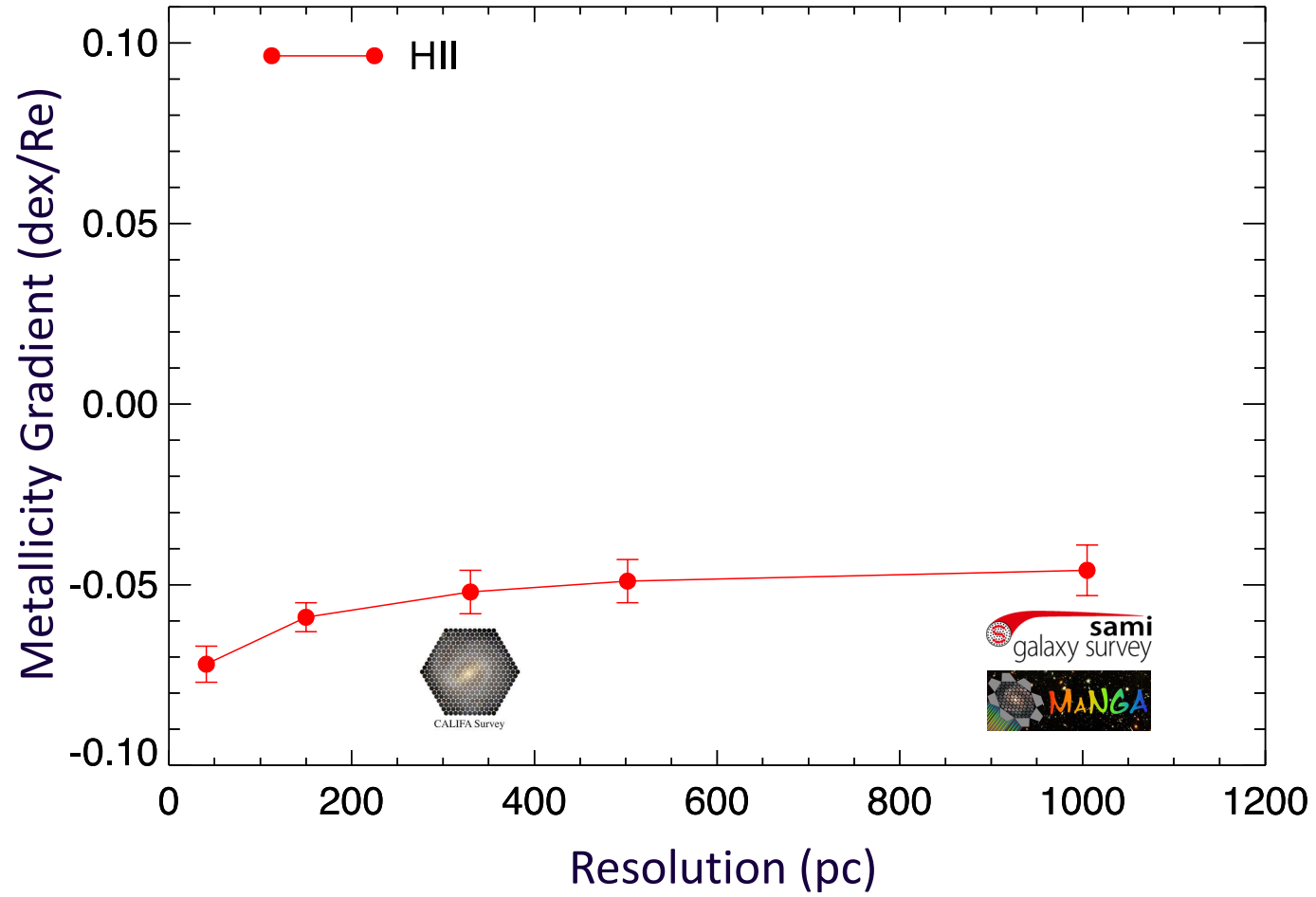
HII + DIG



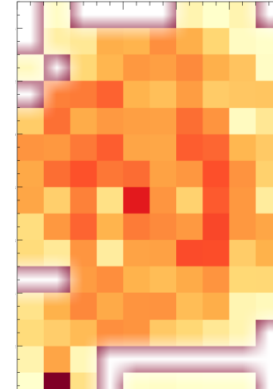
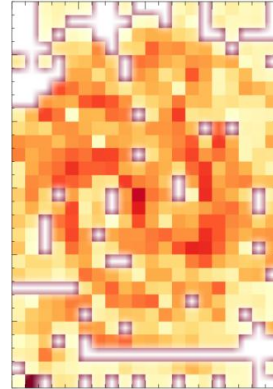
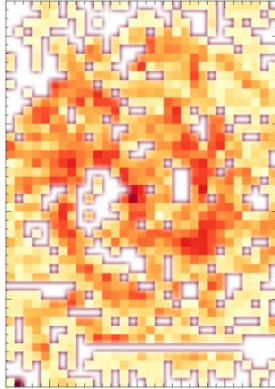
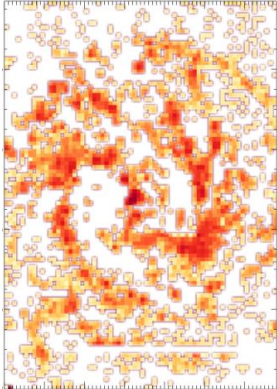
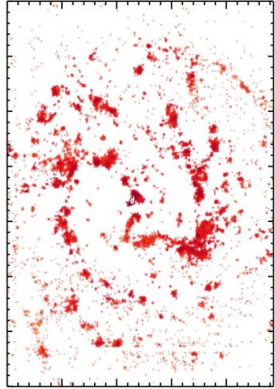
Decreasing Resolution

HII Regions

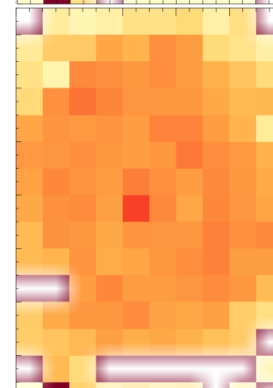
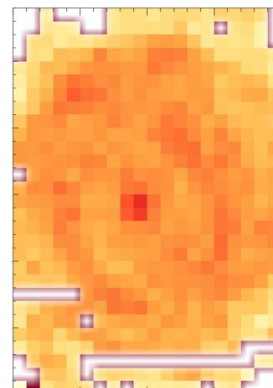
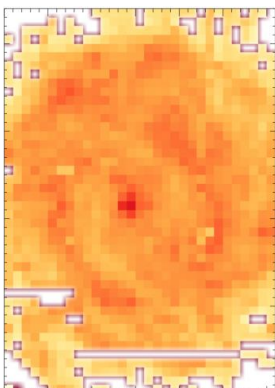
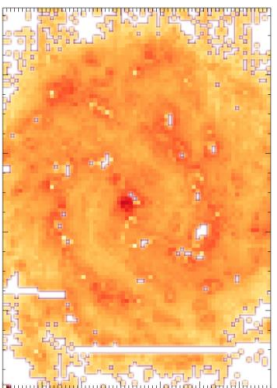
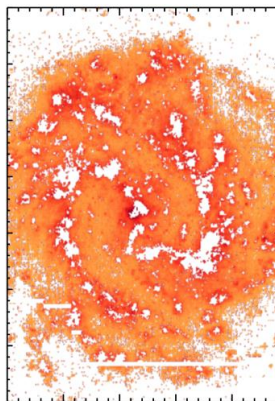




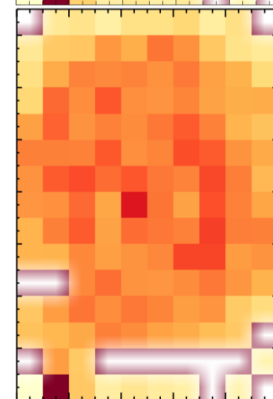
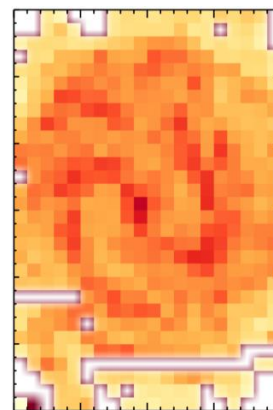
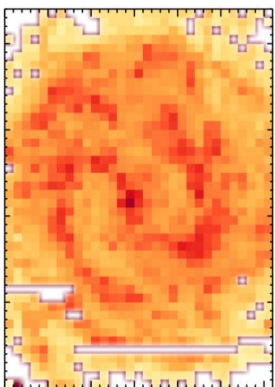
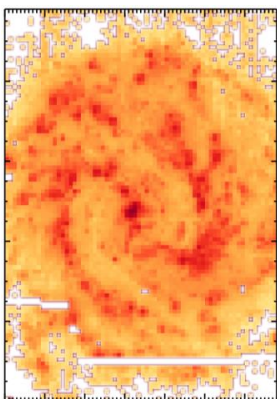
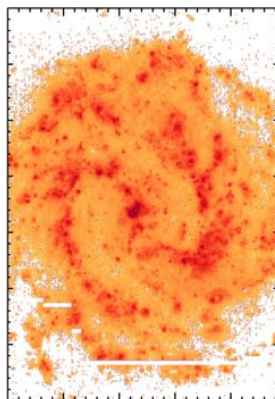
HII
Regions



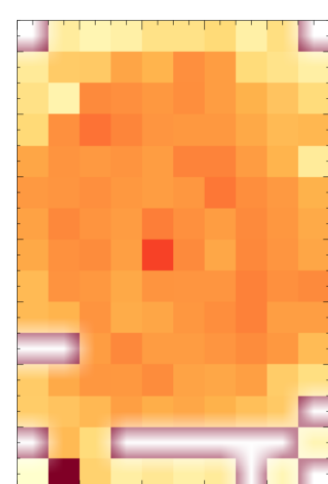
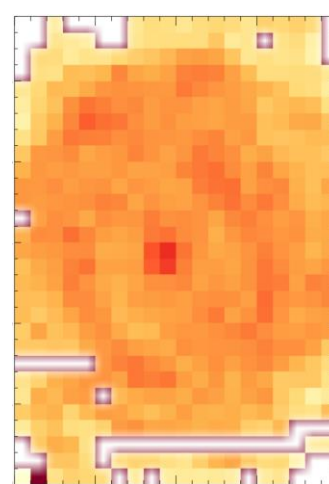
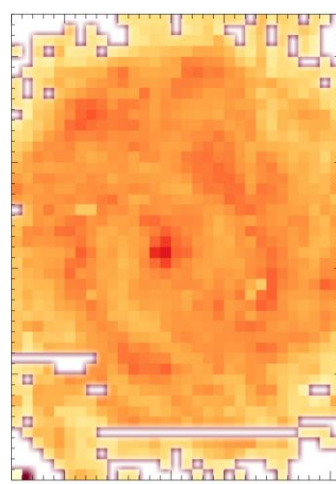
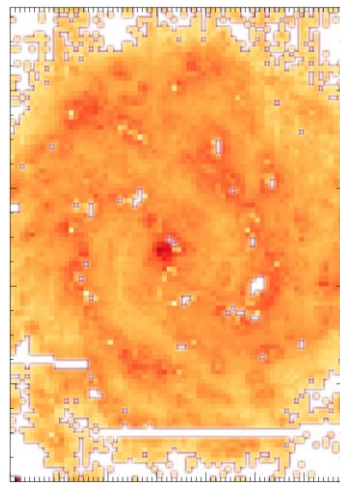
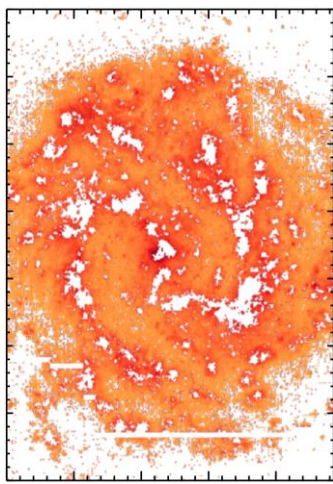
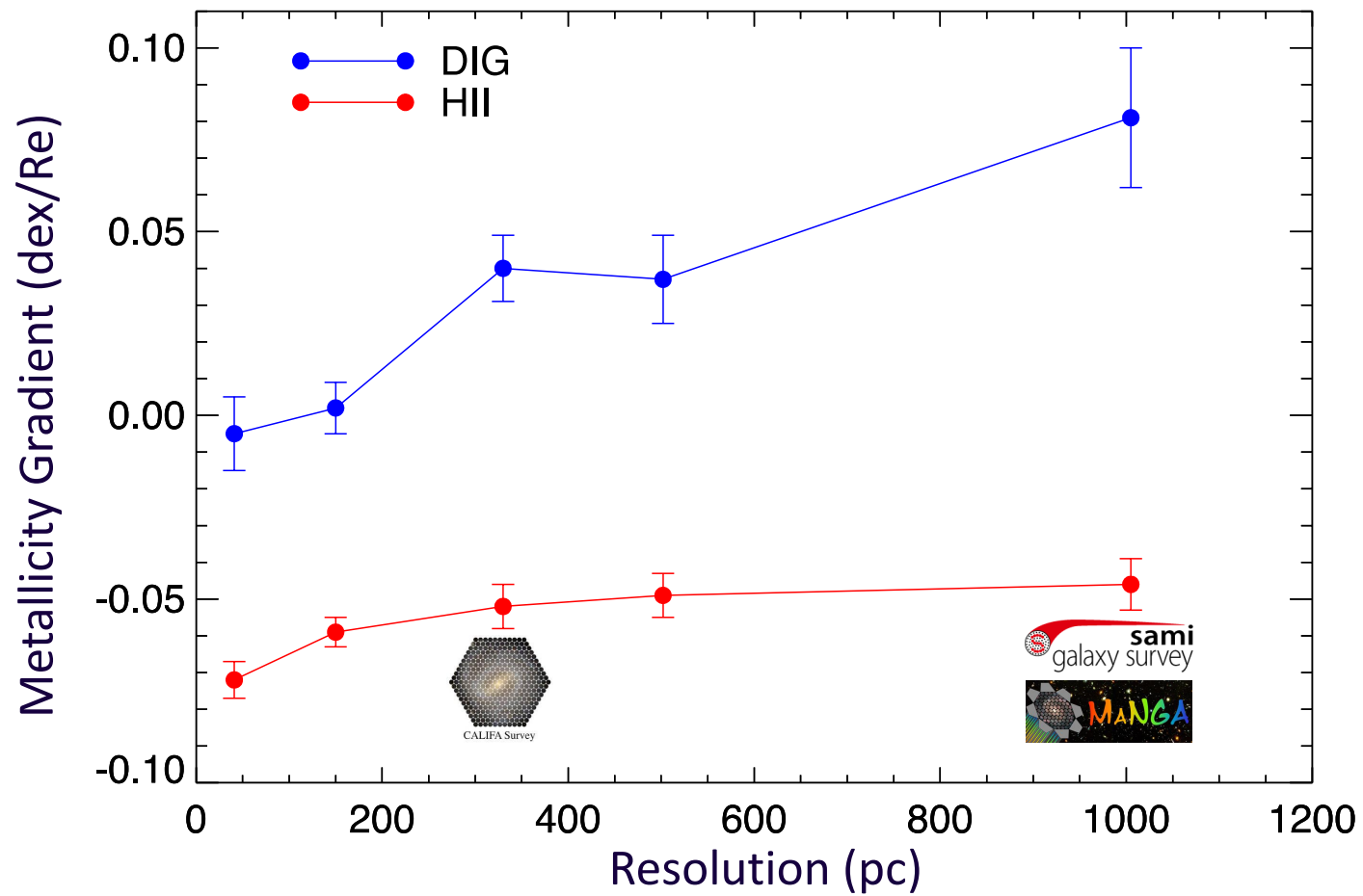
DIG
Regions



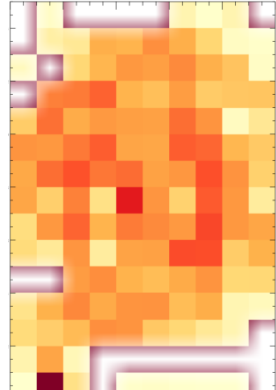
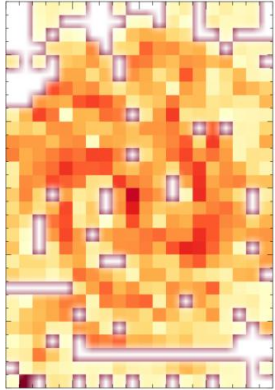
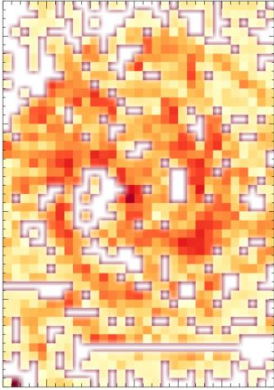
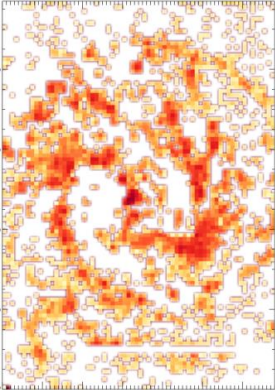
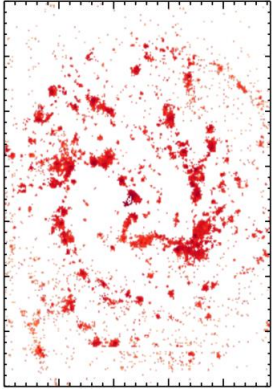
HII + DIG



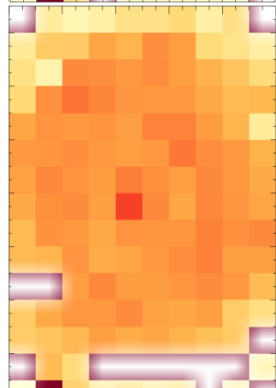
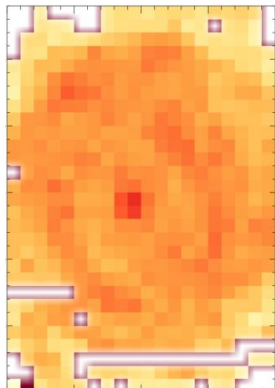
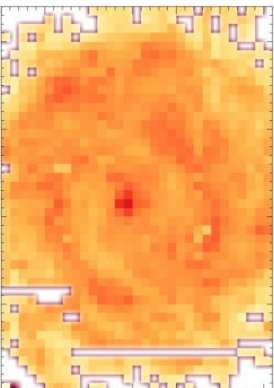
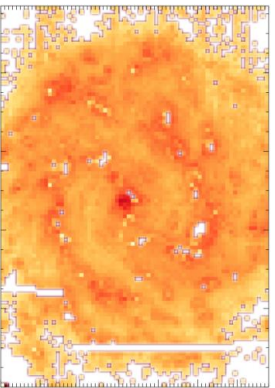
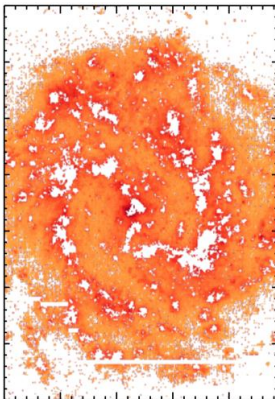
Decreasing Resolution



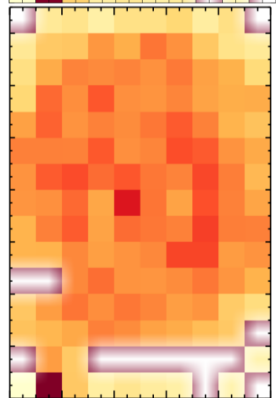
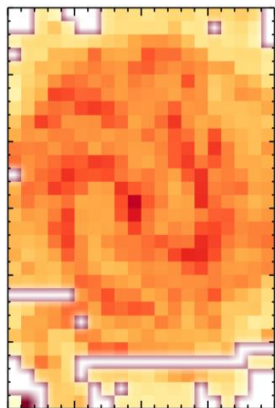
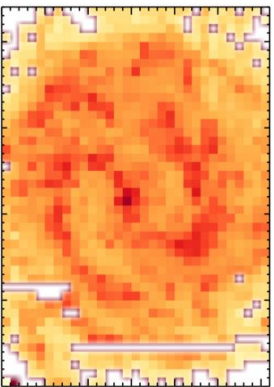
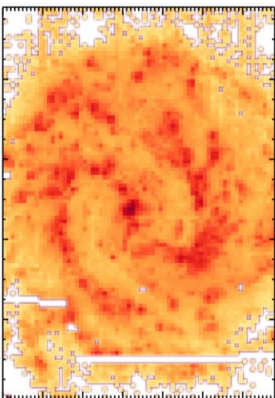
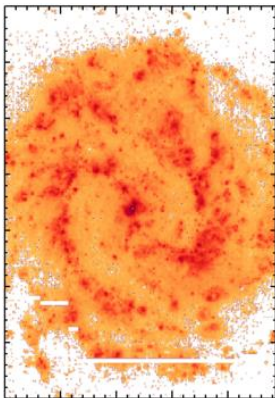
HII
Regions



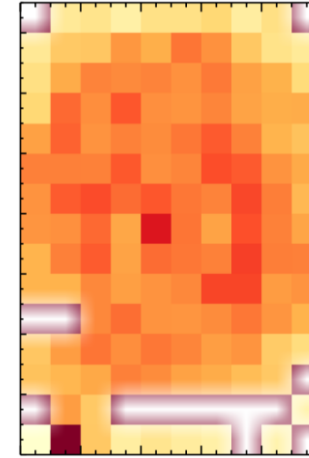
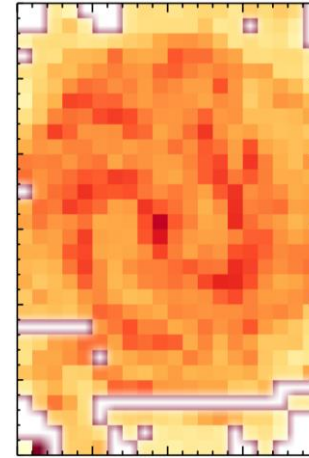
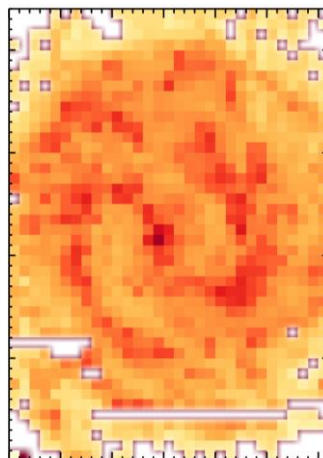
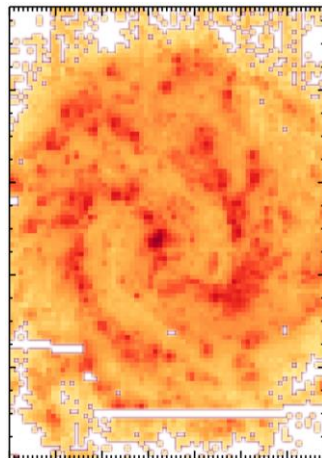
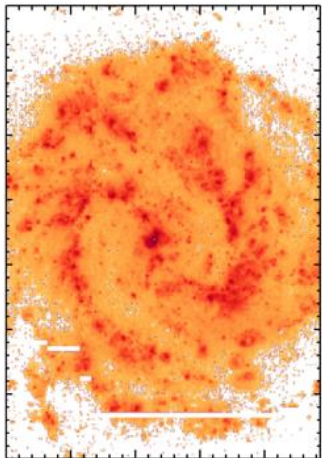
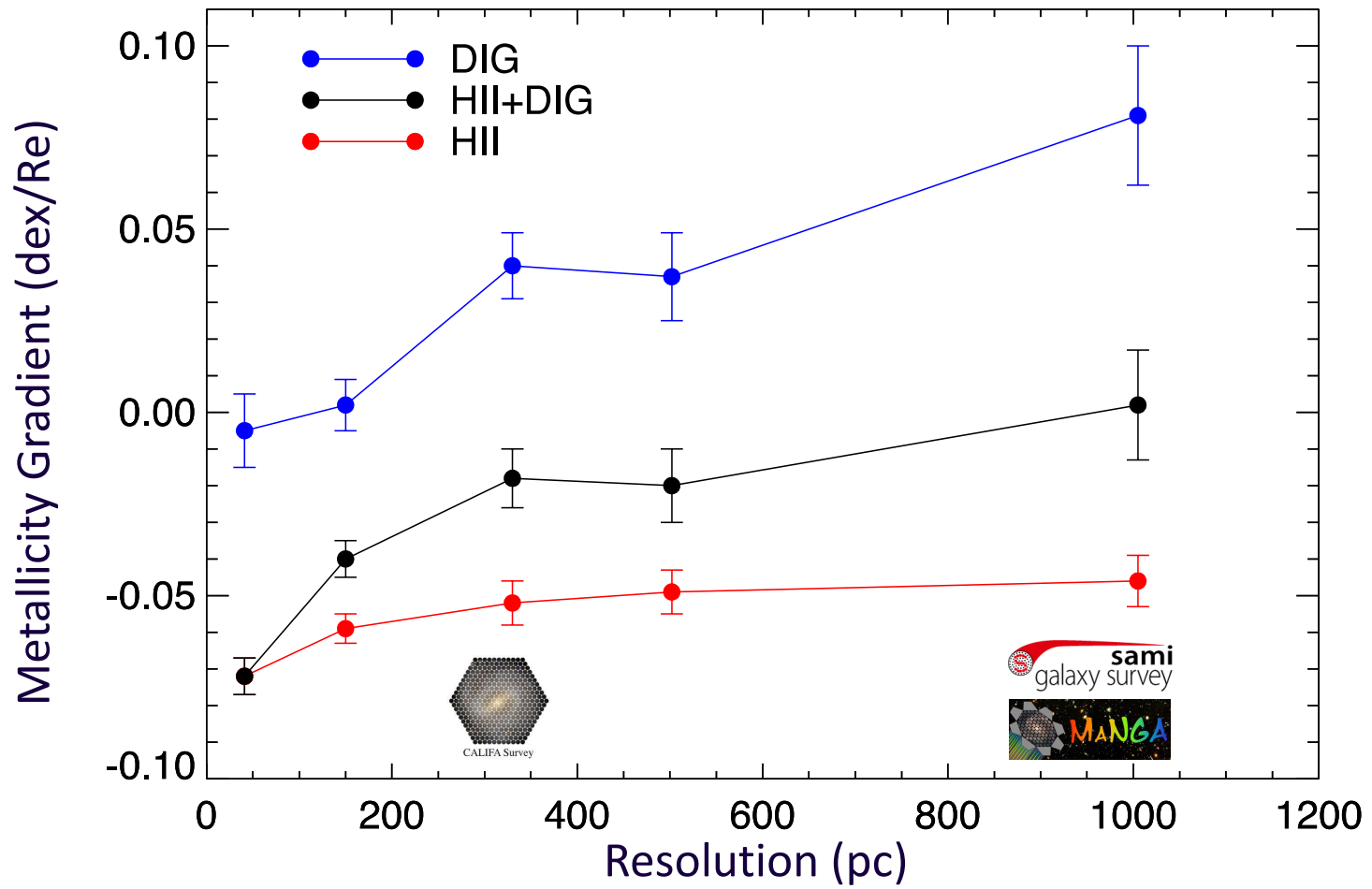
DIG
Regions



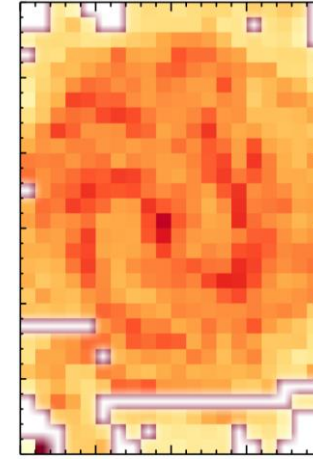
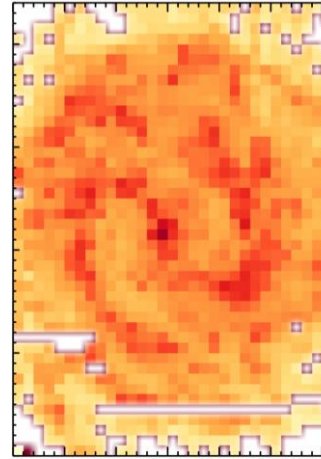
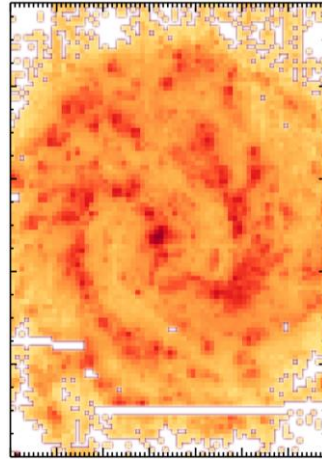
HII + DIG



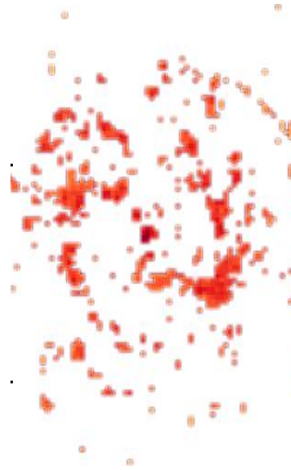
Decreasing Resolution

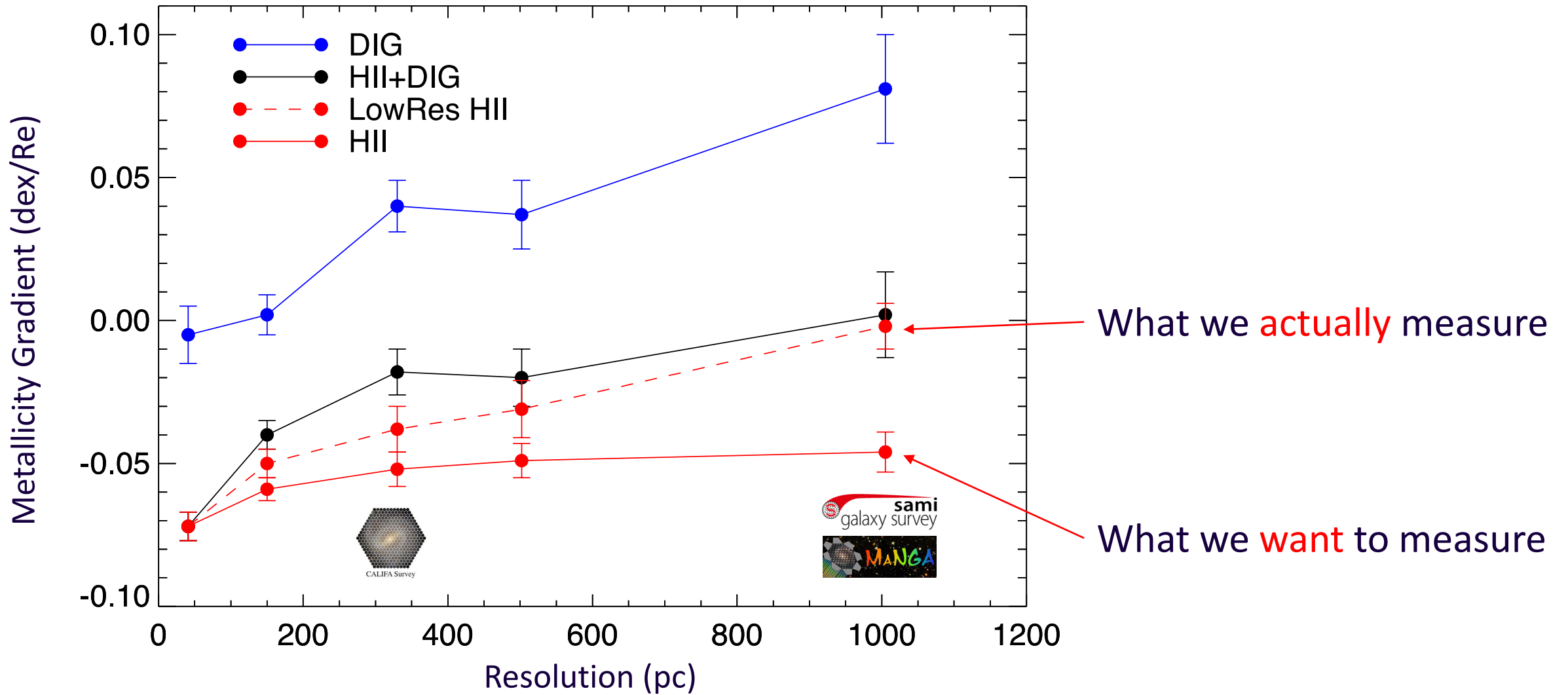


H α Surface Brightness



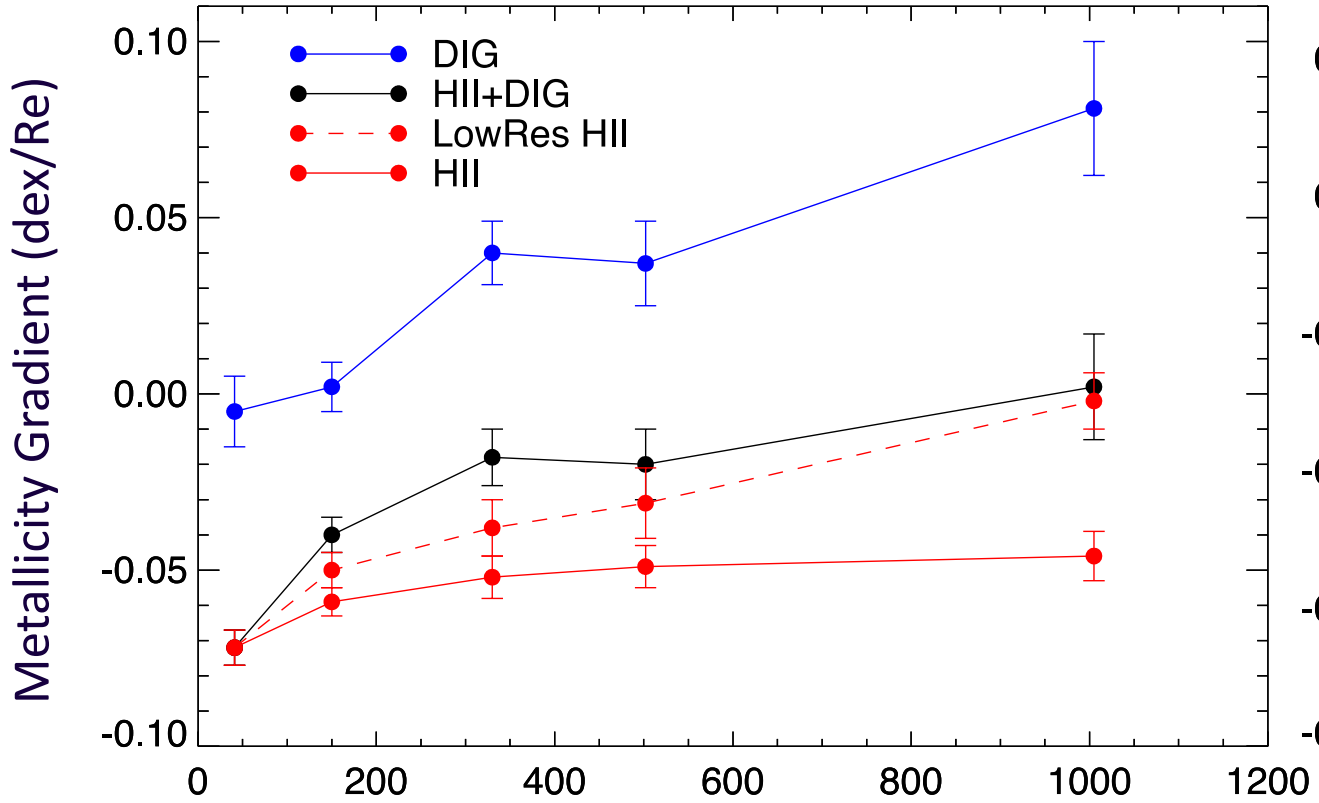
H α Surface Brightness
where [SII]/H α < 0.3





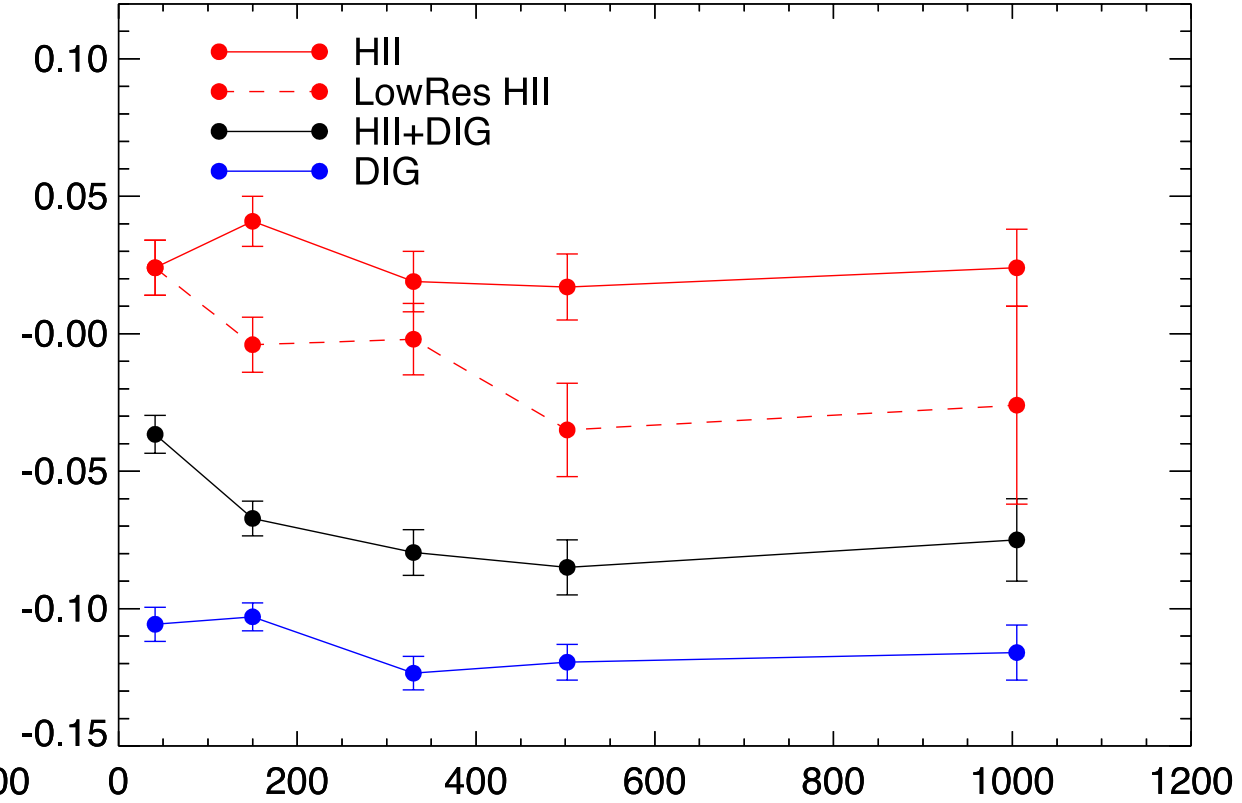
R23 Diagnostic

Kobulnicky et al. 2004



N2S2H α Diagnostic

Dopita et al. 2016



Resolution (pc)

SUMMARY

- The diffuse ionized gas contributes a non-negligible amount of emission to the galaxy spectrum, affecting emission line products
- Diffuse ionized gas contamination significantly affects (flattens or steepens) the measured metallicity gradient
- At the resolution of large IFU surveys and high redshift observations, we can not completely recover the true metallicity gradient. Yet.
- To correct for these effects, more work needs to be on characterizing the distribution and properties of the diffuse ionized gas

