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M81; Near field cosmology beyond the Local Group

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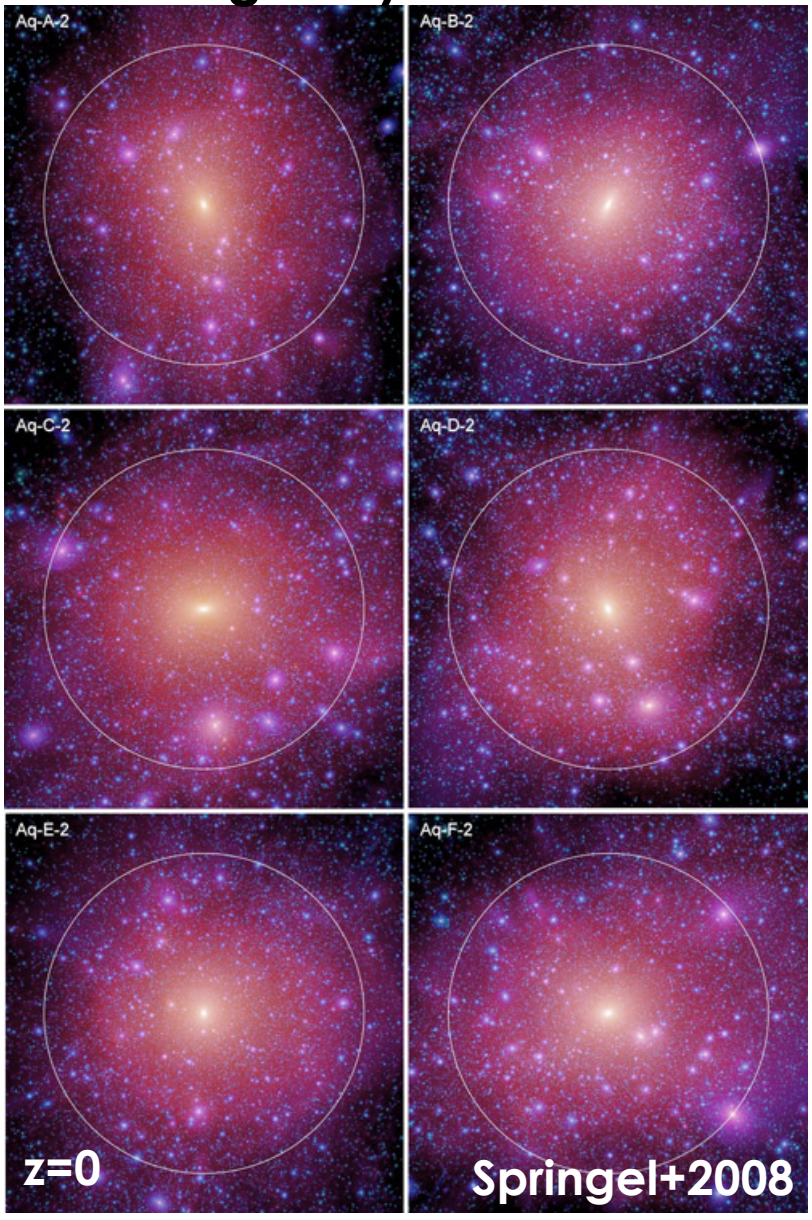
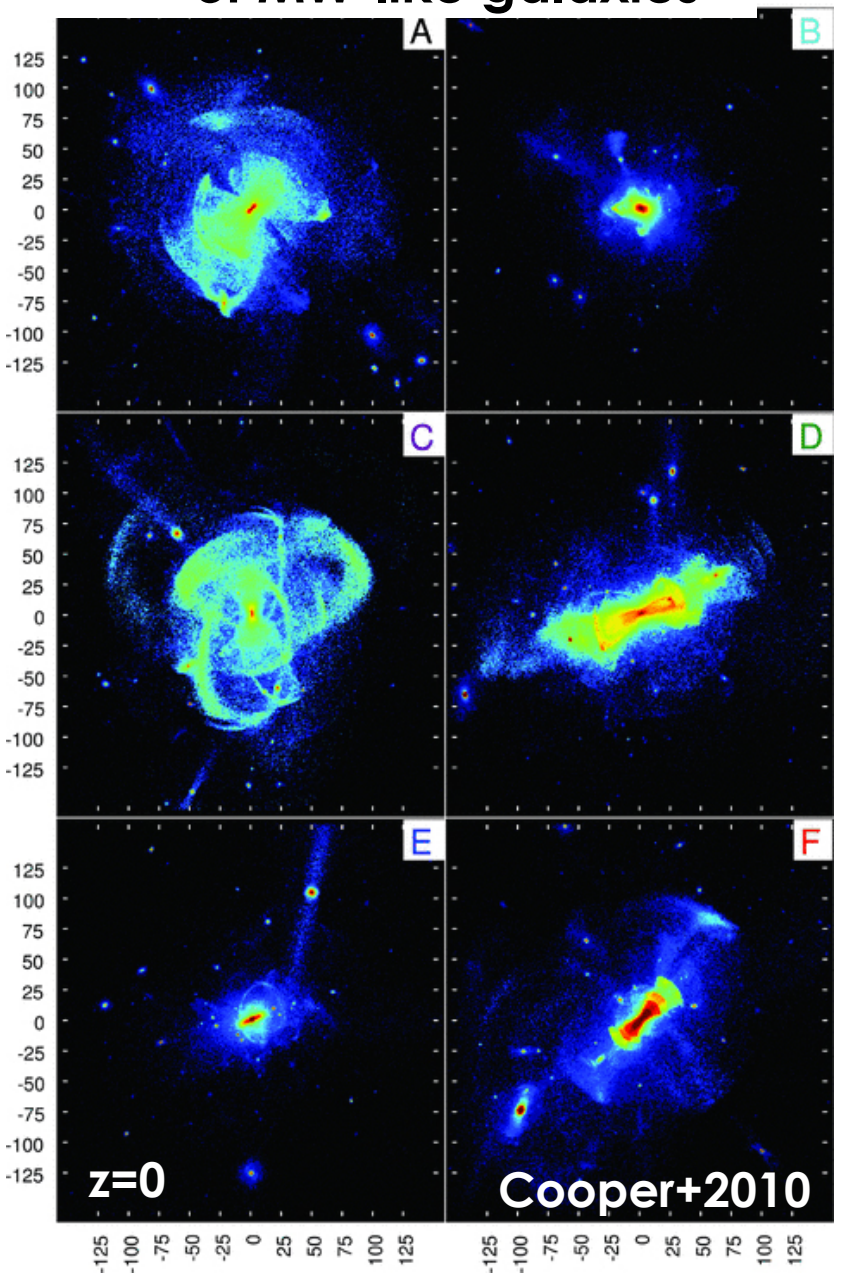
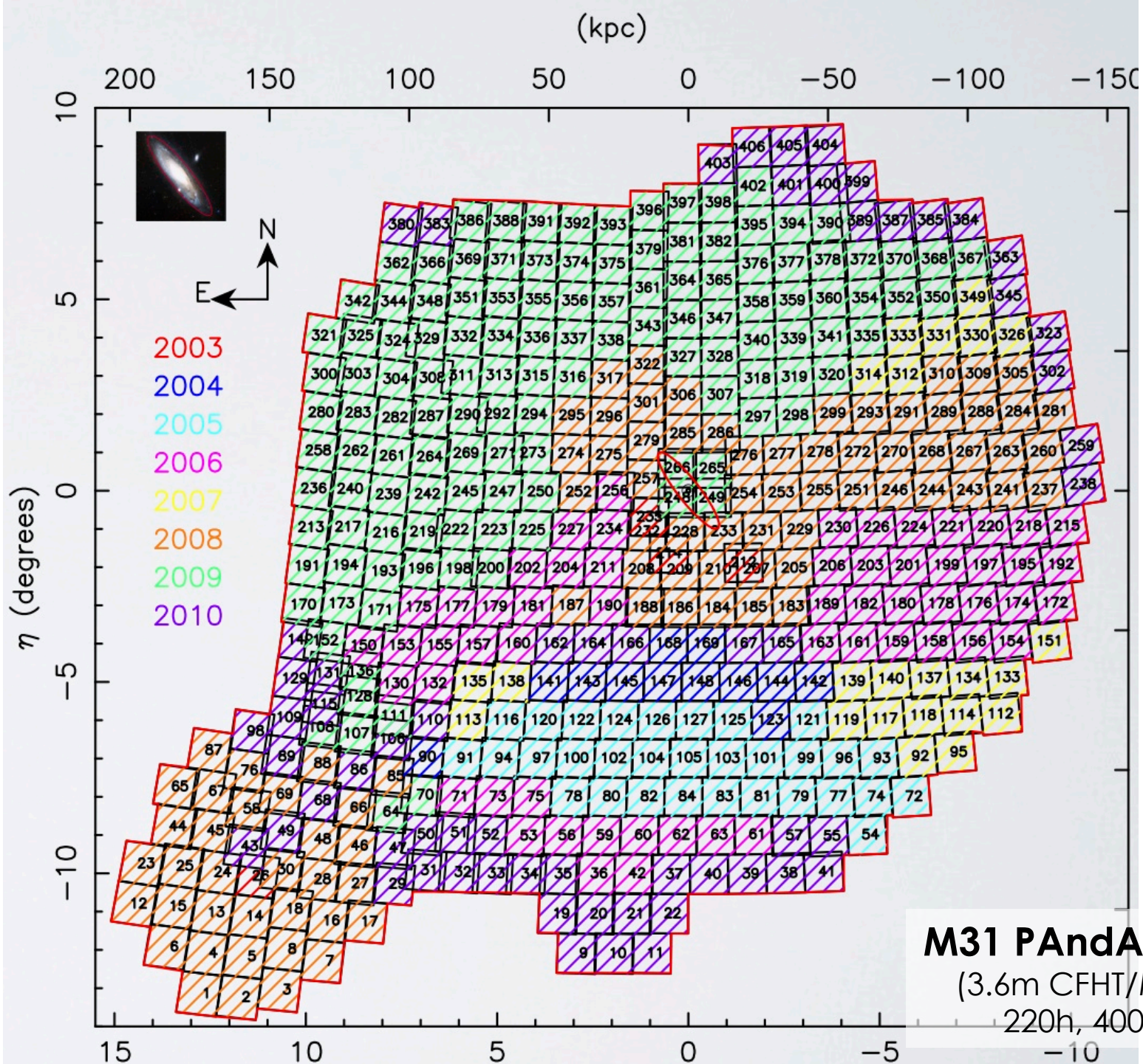
E. Bernard (Edinburgh), Y. Yamada (NAOJ), U. Utsumi (Hiroshima)

DM densities of MW-like galaxy halos



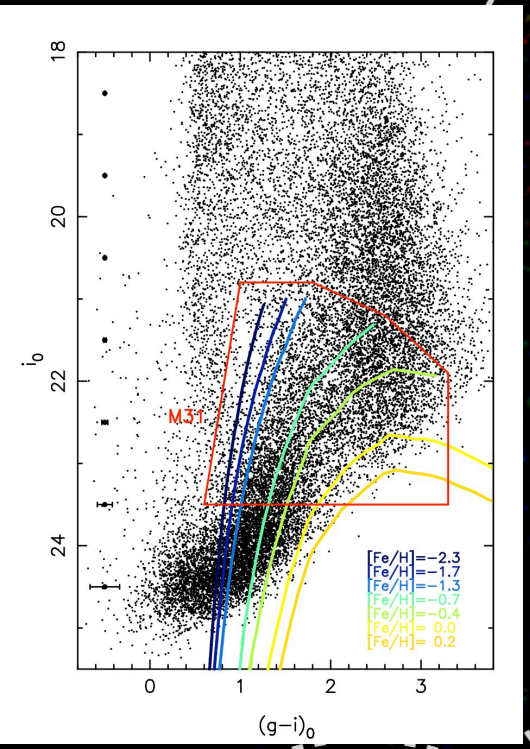
Stars formed in satellites of MW-like galaxies





M31 PAndAS Survey
(3.6m CFHT/Megacam
220h, 400 pointings)

[Fe/H] ~ –2.3
[Fe/H] ~ –1.4
[Fe/H] ~ –0.7



150 kpc

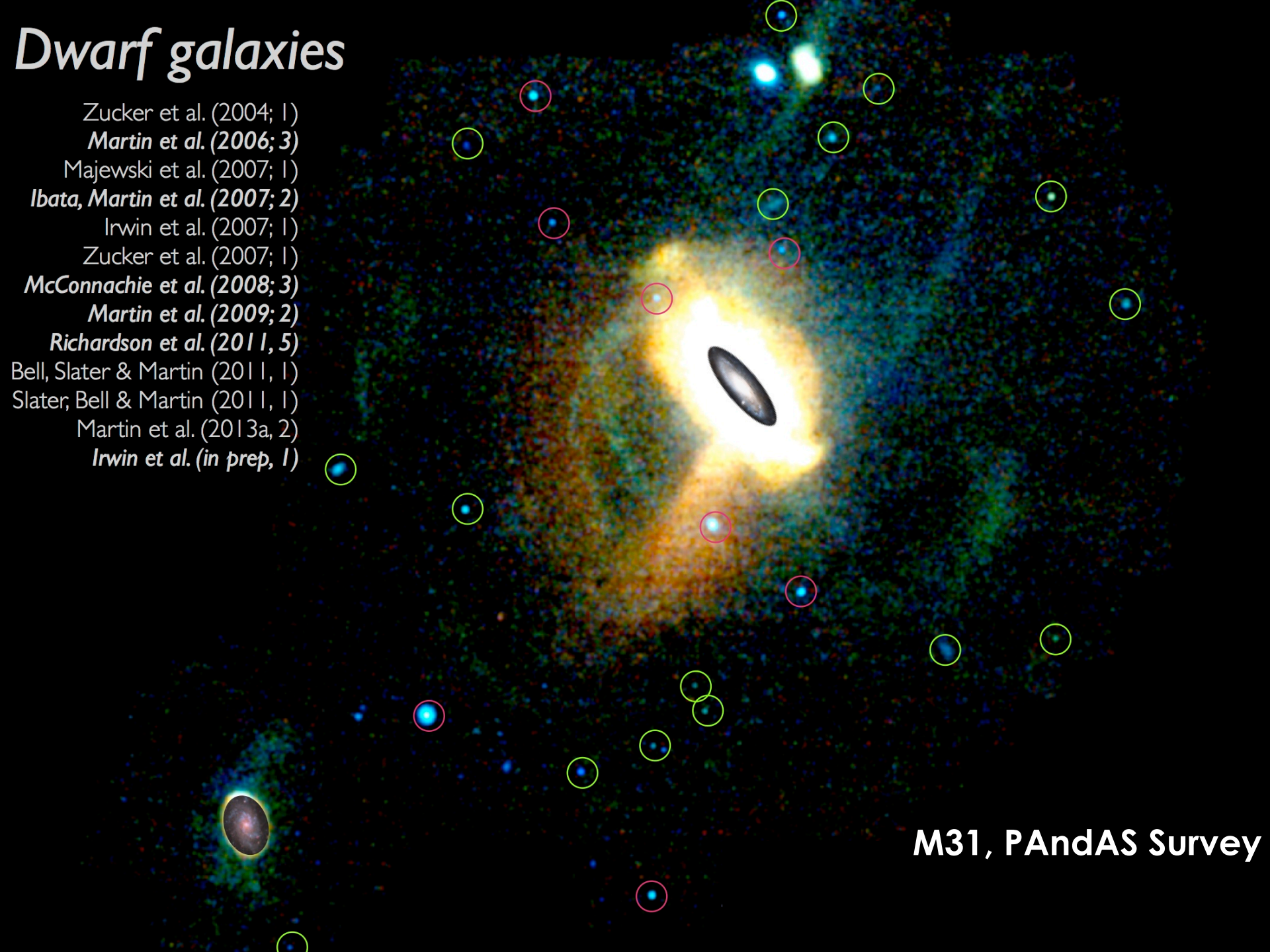
50 kpc

M31, PAndAS Survey

Martin et al. (2013b)

Dwarf galaxies

Zucker et al. (2004; 1)
Martin et al. (2006; 3)
Majewski et al. (2007; 1)
Ibata, Martin et al. (2007; 2)
Irwin et al. (2007; 1)
Zucker et al. (2007; 1)
McConnachie et al. (2008; 3)
Martin et al. (2009; 2)
Richardson et al. (2011, 5)
Bell, Slater & Martin (2011, 1)
Slater, Bell & Martin (2011, 1)
Martin et al. (2013a, 2)
Irwin et al. (in prep, 1)



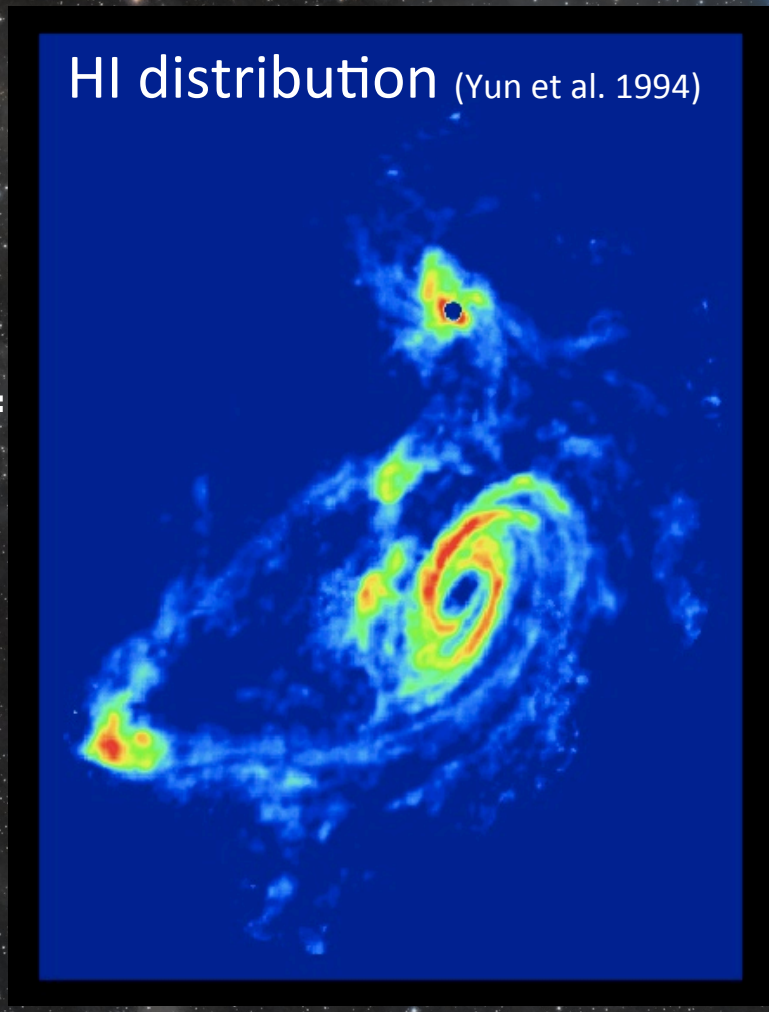
M31, PAndAS Survey

Near field cosmology beyond the LG with HSC/Subaru

M82
M_V=-19.4

M81
M_V=

NGC3077
M_V=-17.2
(LMC: -17.6)

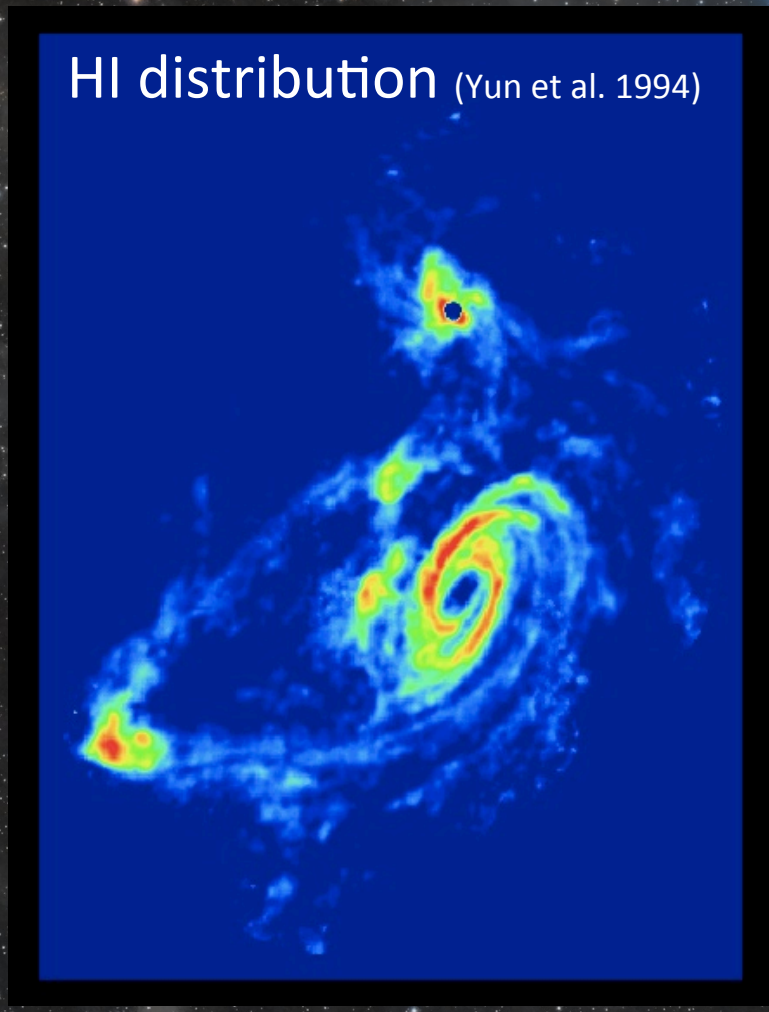


http://apod.nasa.gov/

Near field cosmology beyond the LG with HSC/Subaru (S14A-184, S14B-101, S15B-073, S16A-096, PI: S.Okamoto)

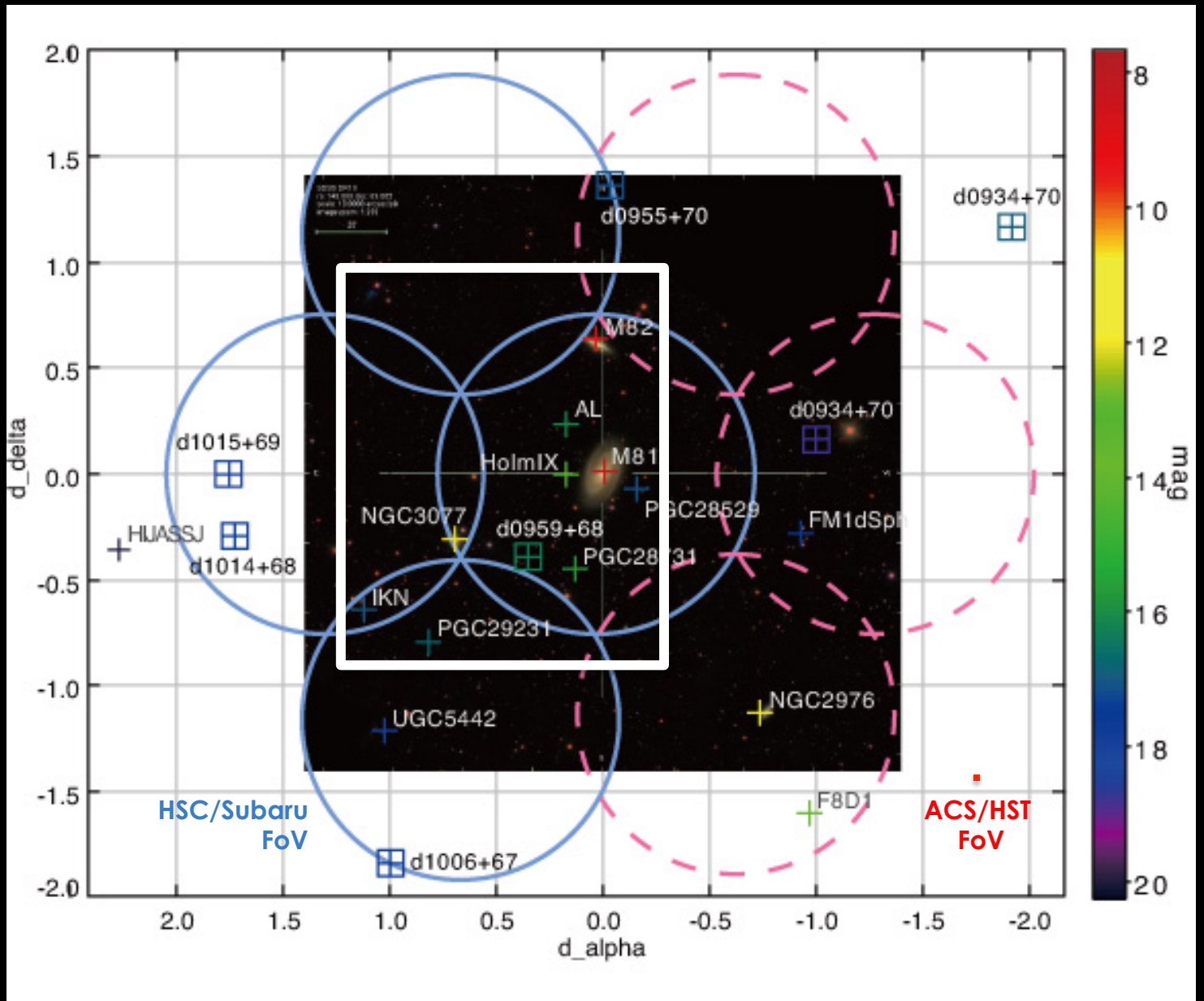
M81, MW analogue lies at 3.6Mpc

- True nature of young/old stellar contents in the large scale structures
- Age and metallicity constraints for the extended component
- New stellar debris, satellites, streams, arcs in the entire region
- Globular clusters in the M81 group



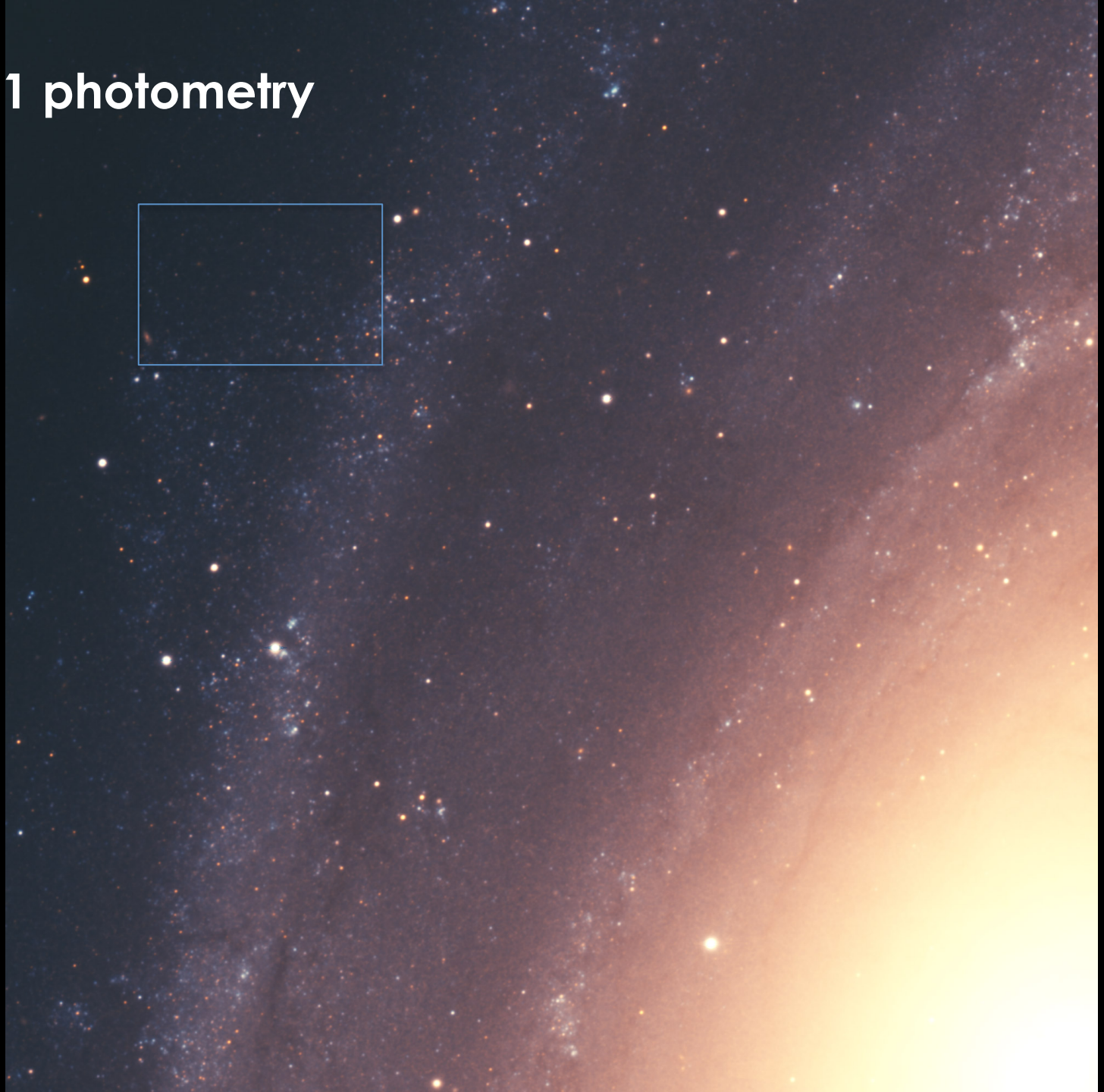
http://apod.nasa.gov/

Near field cosmology beyond the LG with HSC

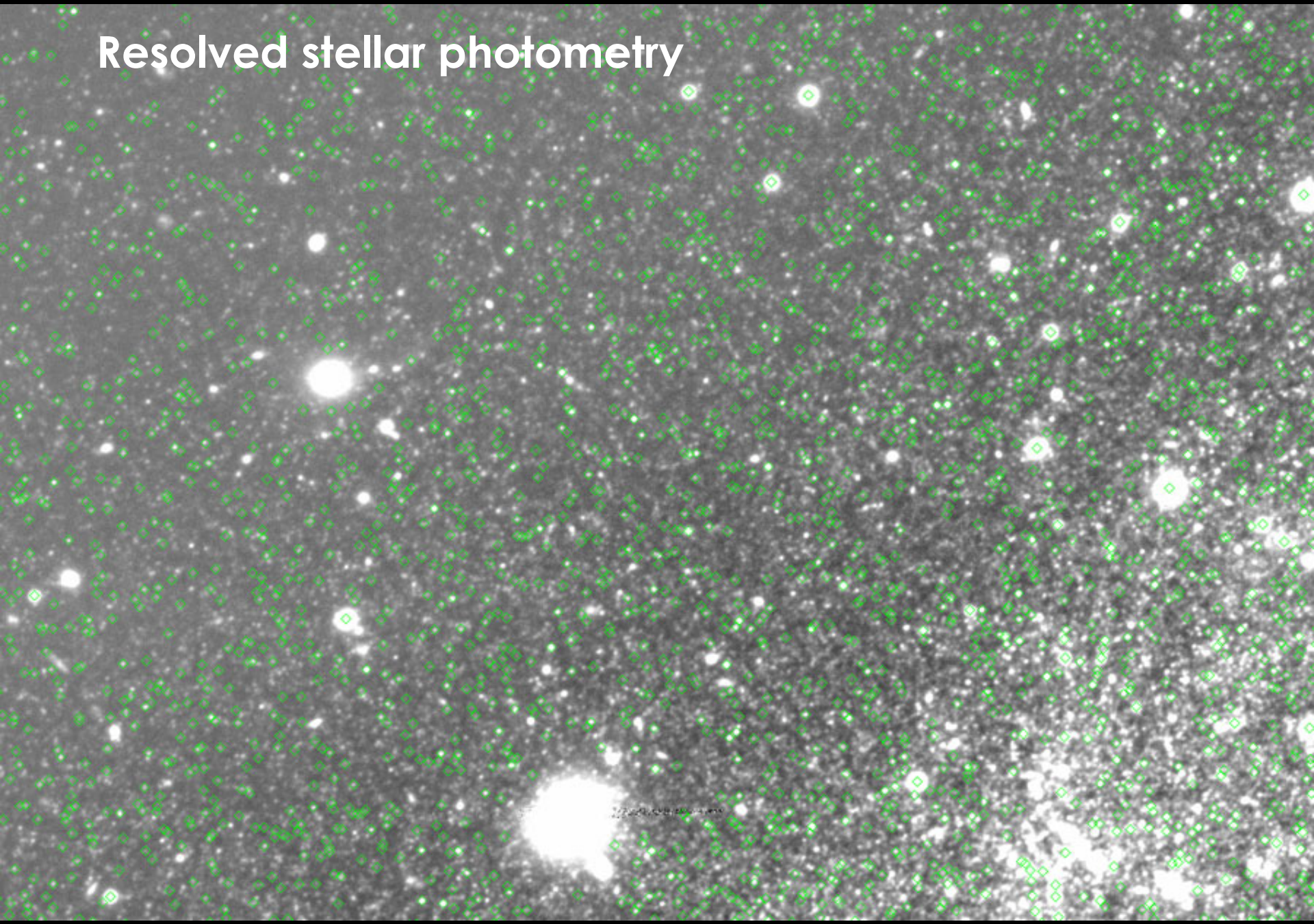


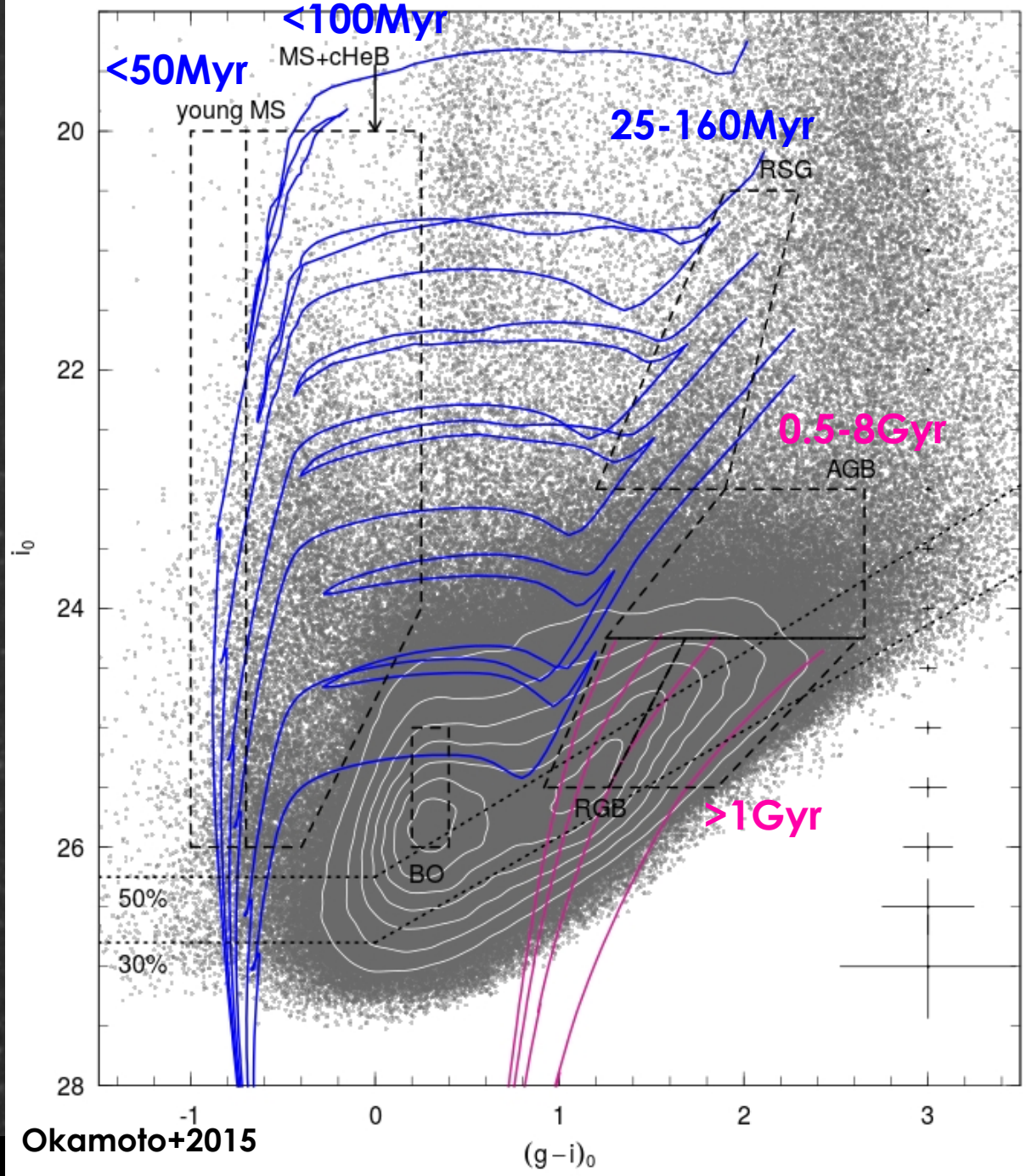
M81 photometry

M81 photometry



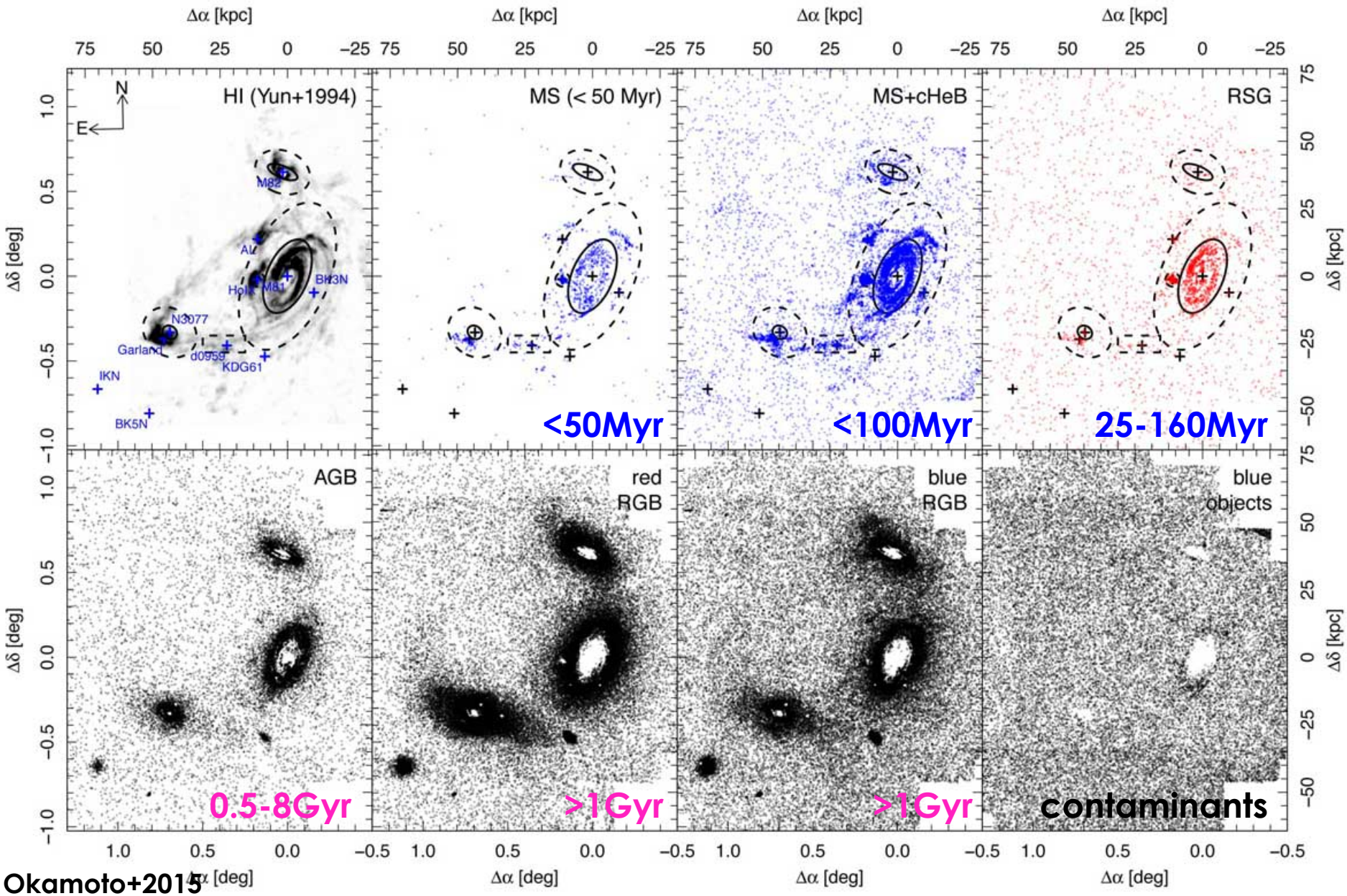
Resolved stellar photometry





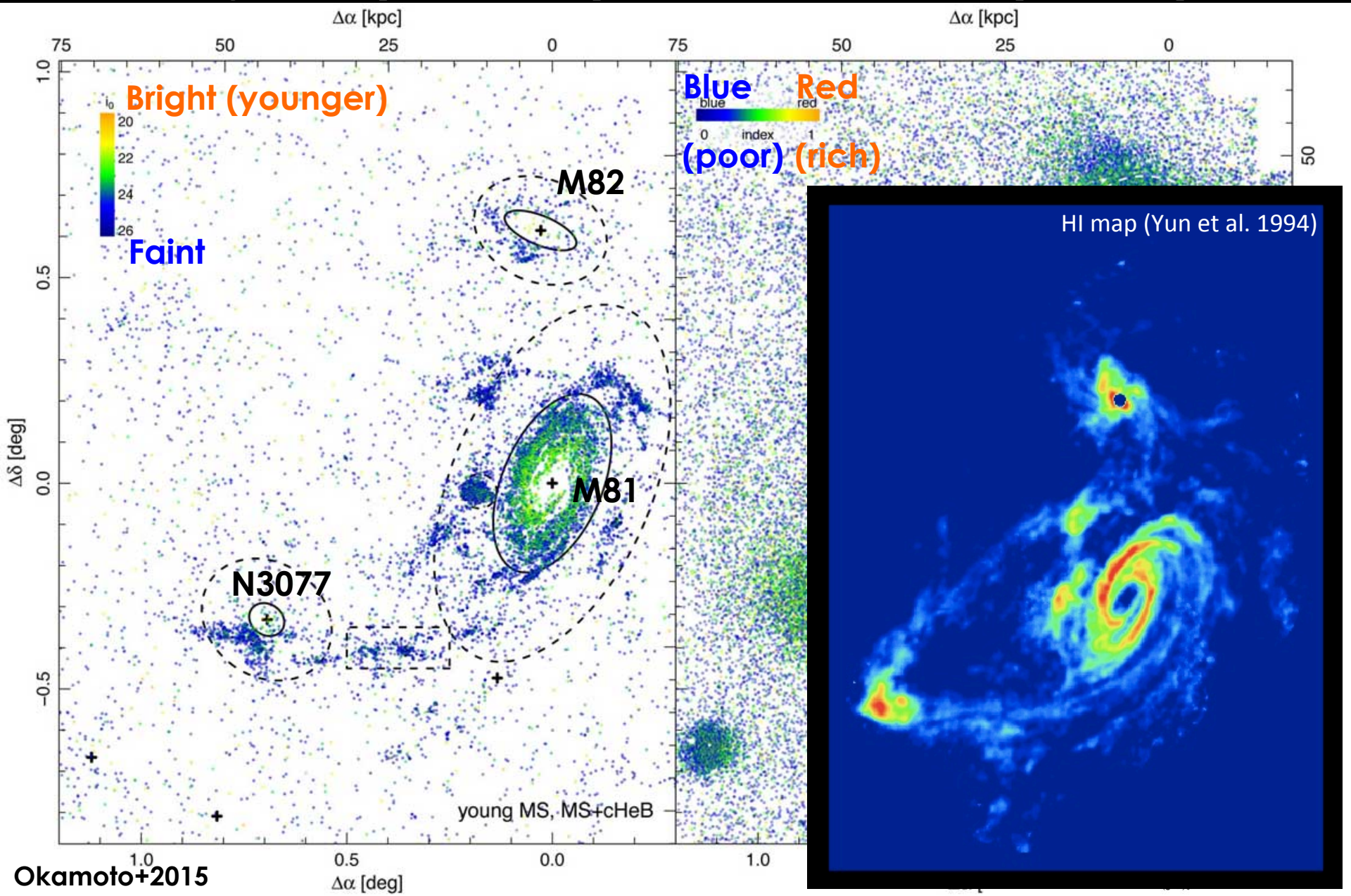
Okamoto+2015

Spatial distributions of each populations



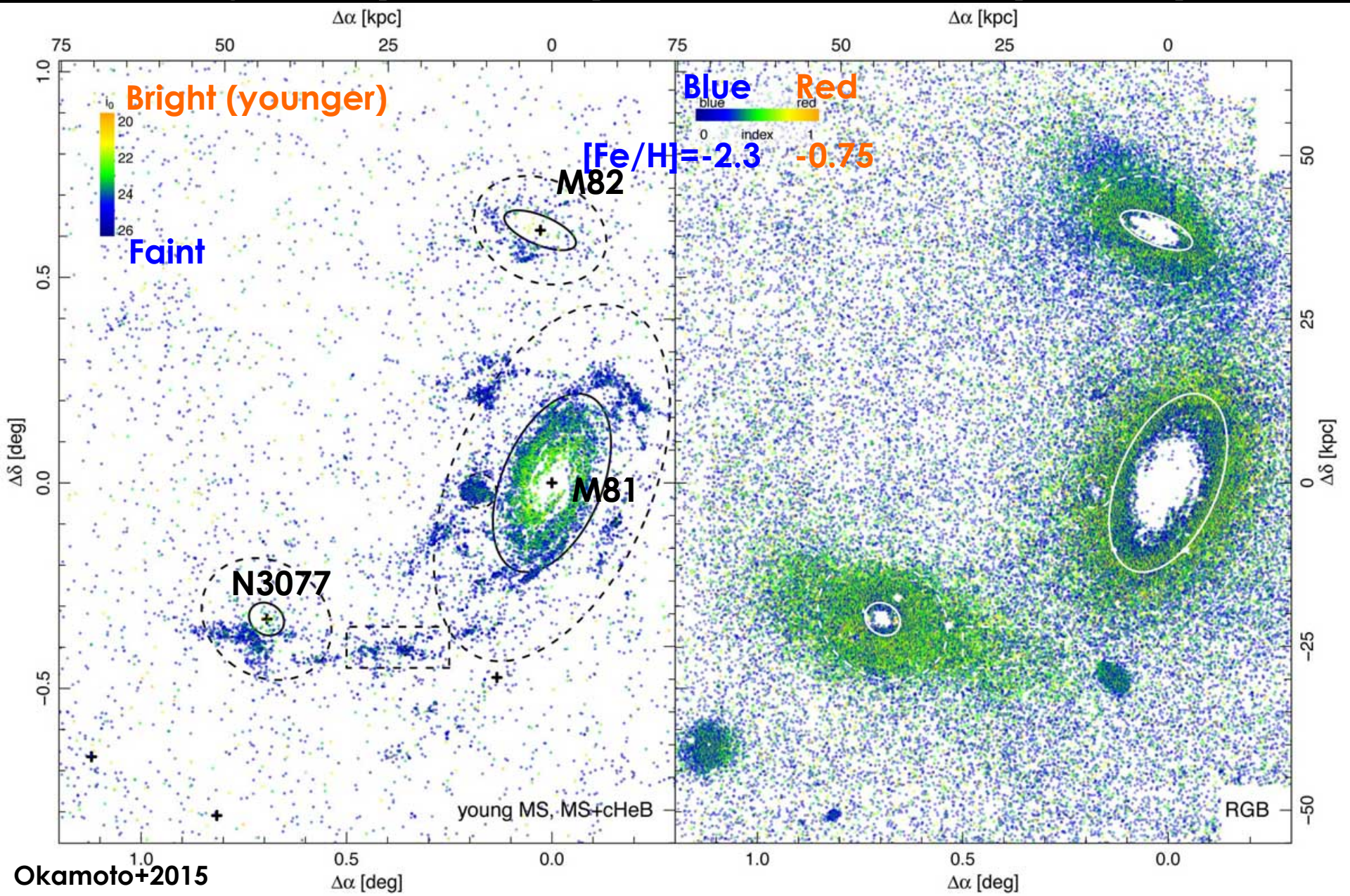
Okamoto+2015

Young stars (<100Myrs) Old stars (>1Gyrs)



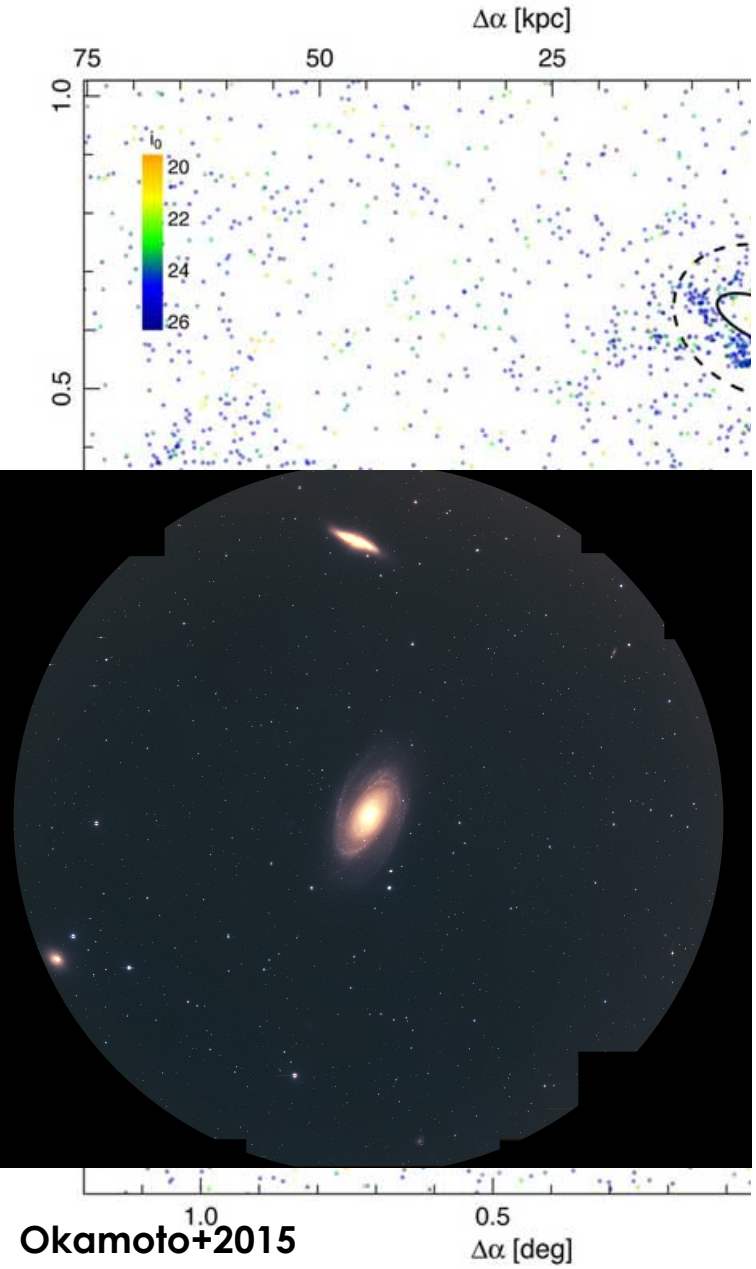
Okamoto+2015

Young stars (<100Myrs) Old stars (>1Gyrs)

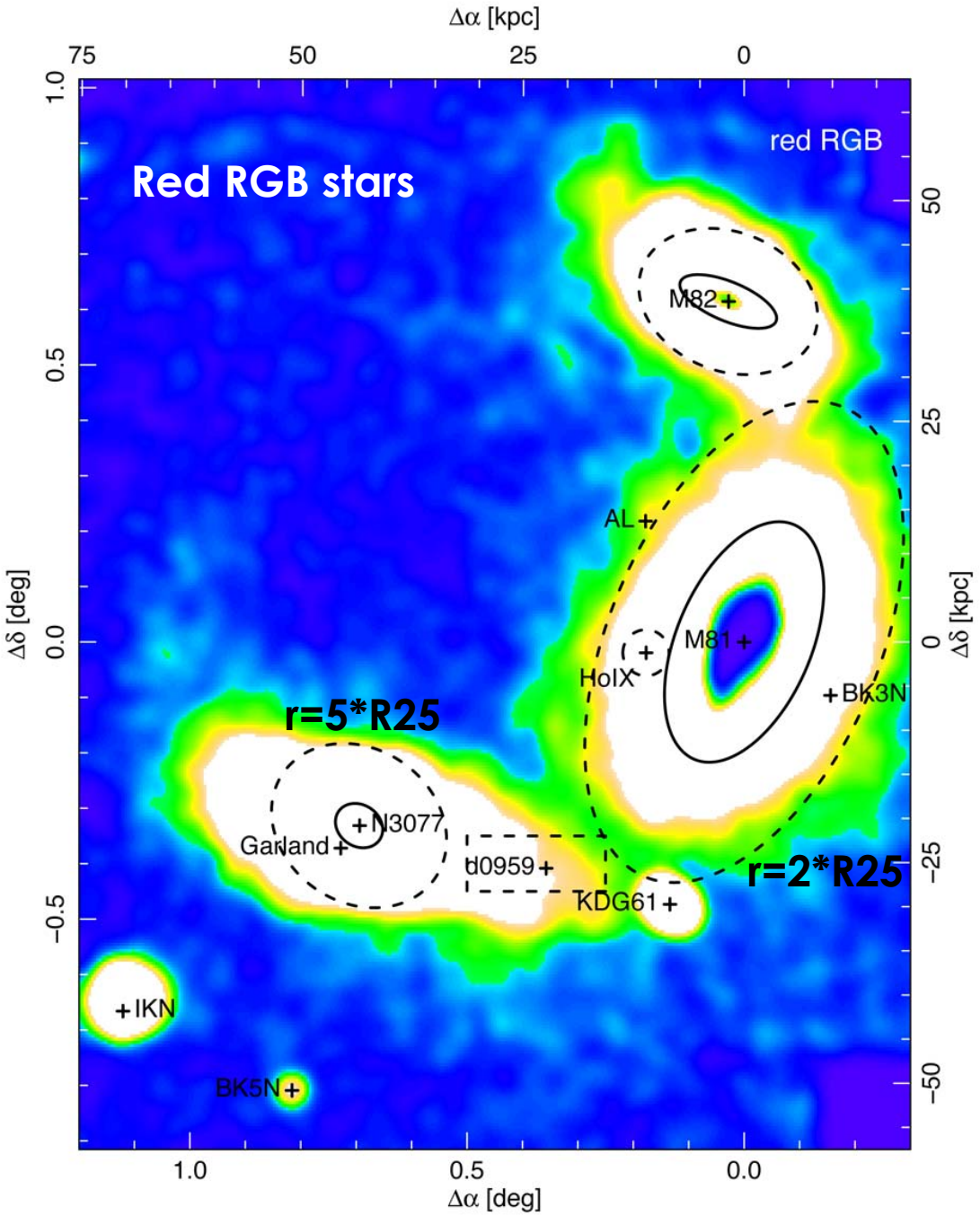


Okamoto+2015

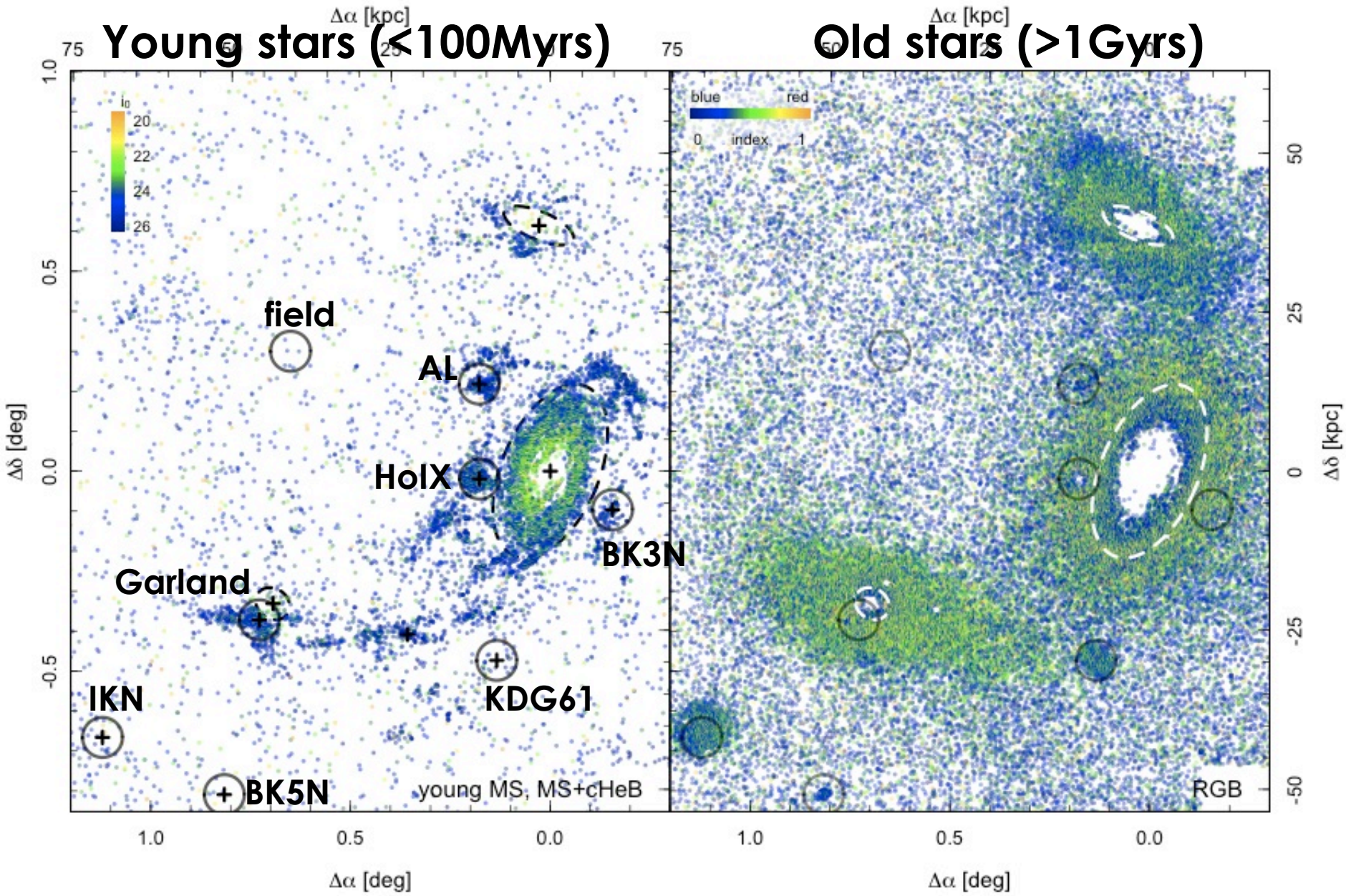
Spatial distributions



Okamoto+2015



Dwarf galaxies in M81 group



Summary

M81 galaxy archeology : We present the first results from a deep wide-field imaging survey of the M81 group center that we are conducting with HSC/Subaru, which reveals the first truly panoramic view of the low surface brightness stellar component.

- **Young intra-group pop follow the HI filamentary distributions.**
- **Young stars in a stellar stream between M81 and NGC3077, AL, HoIX, Galand and in numerous outlying stellar associations, which SF was synchronized each other (i.e. tidal dwarfs).**
- **Very extended (>2*R_{25}) old stellar halos of M81, M82, NGC3077**
- **Highly disturbed morphologies of M82 and NGC3077 halo**
- **Bluer (more metal-poor) outer halo of M82**

On-going works….

Analyses of halo profiles & individual dwarf galaxies,
Exploration of new satellites/streams/substructures,
Data processing, Photometry, Observations,
Writing the follow-up proposals & papers…