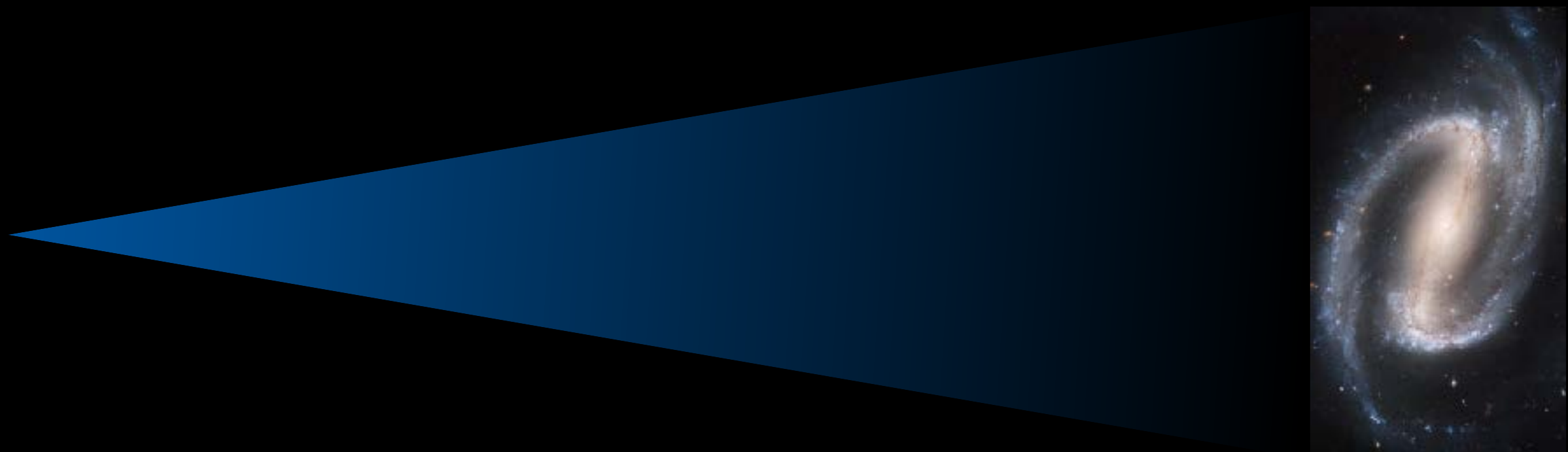




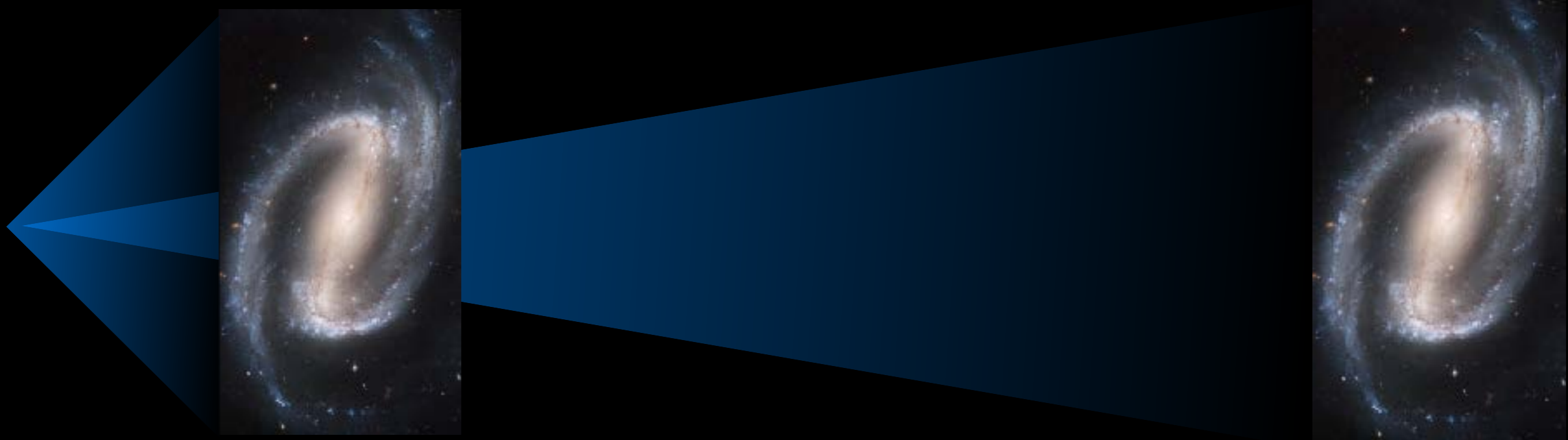
Roman Infrared Nearby Galaxies Survey

Ben Williams (University of Washington)
PI: Nearby Galaxies GA Science Investigation Team
Once known as WINGS

Near-Field is Inherently Wide-Field

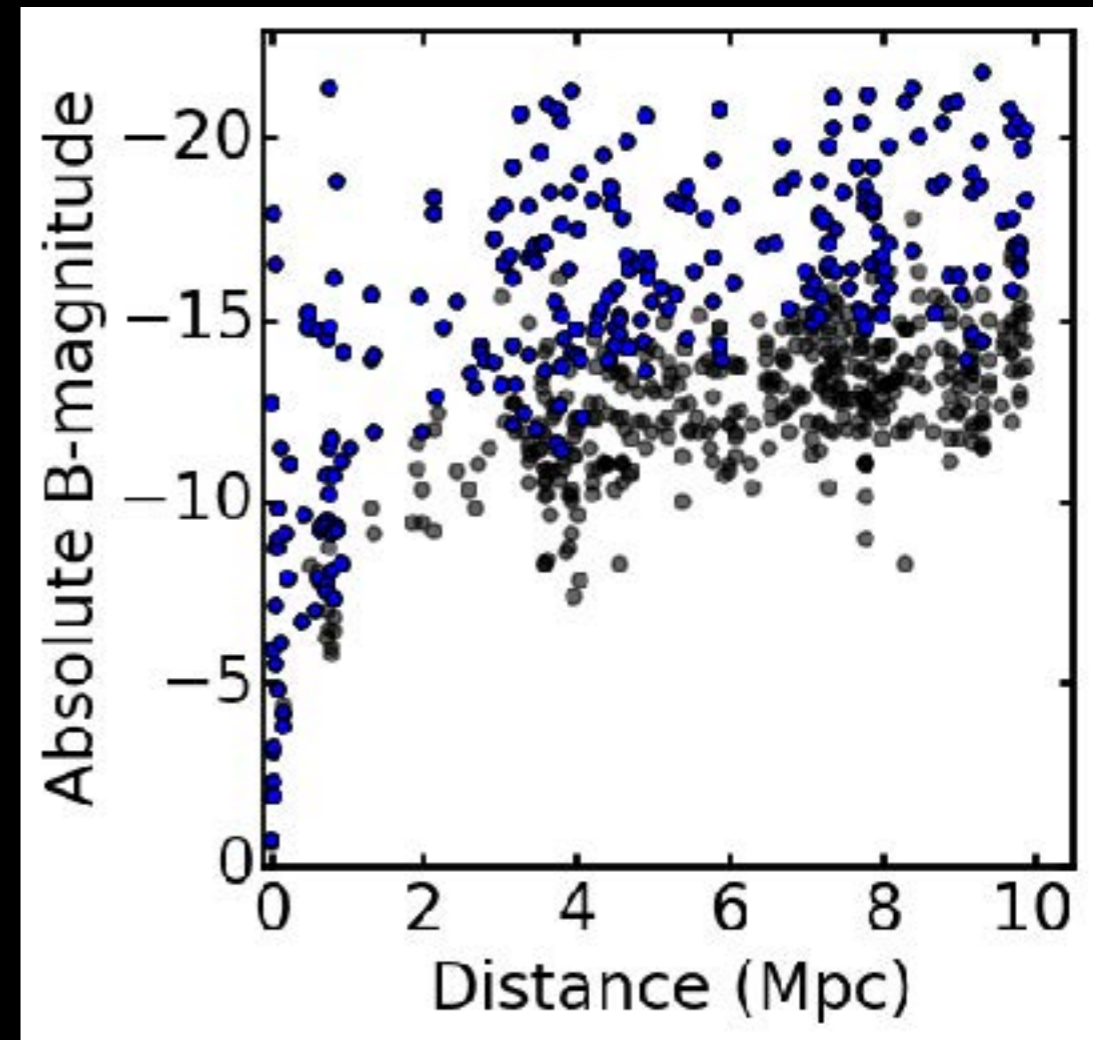
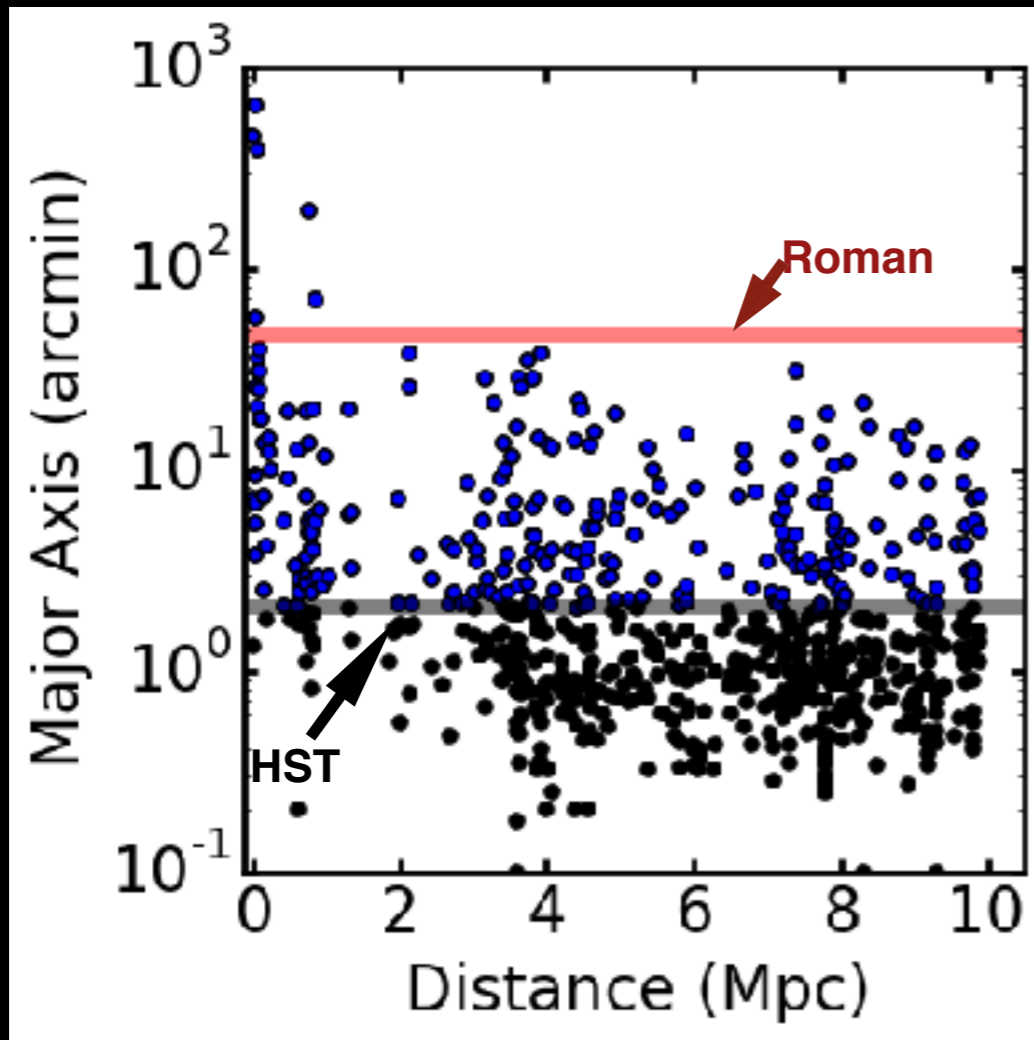


Near-Field is Inherently Wide-Field

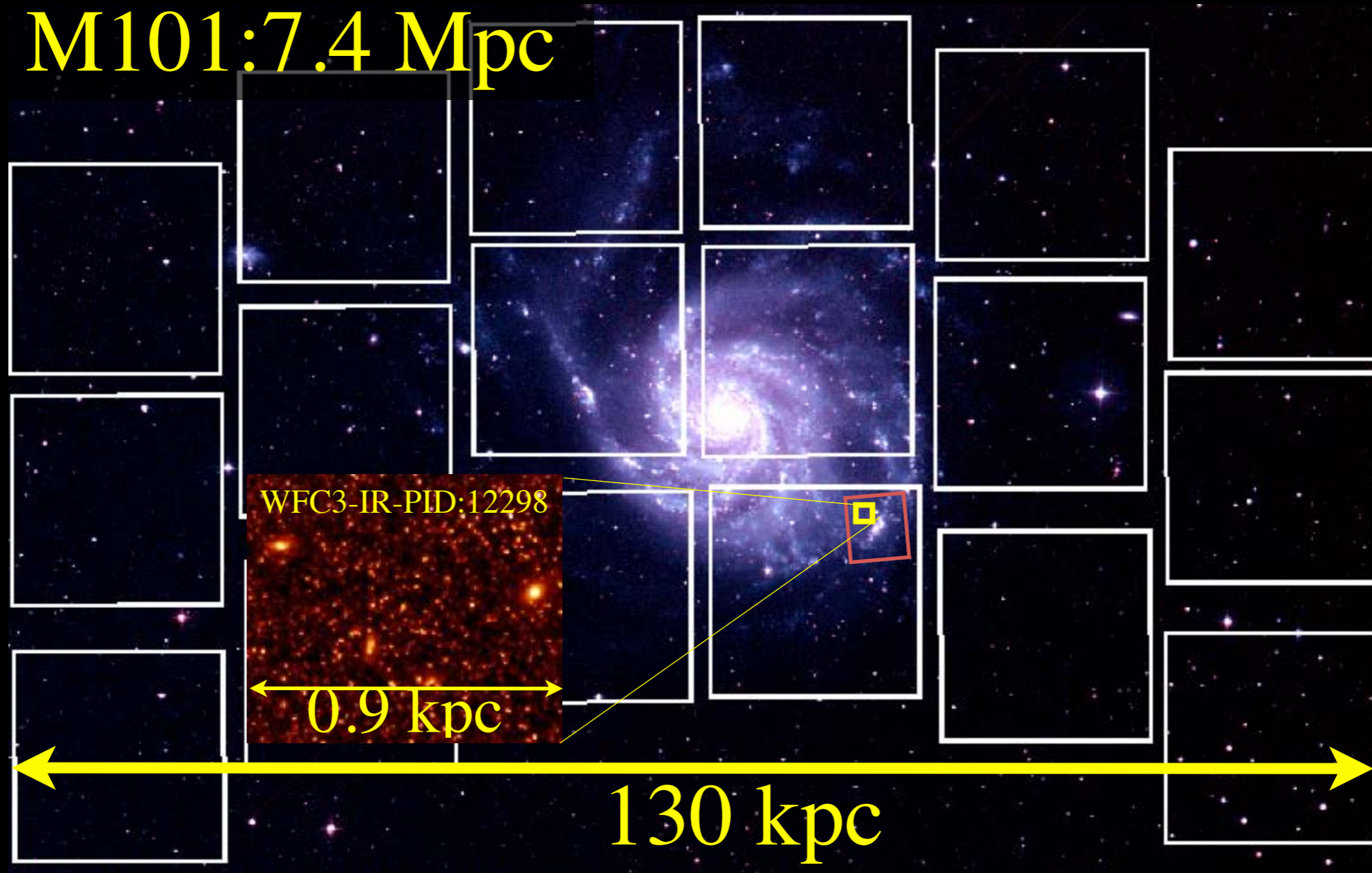


- Resolution improves as D
- Limiting depth improves as $\sim D^2$
- Required survey area degrades as D^{-2}

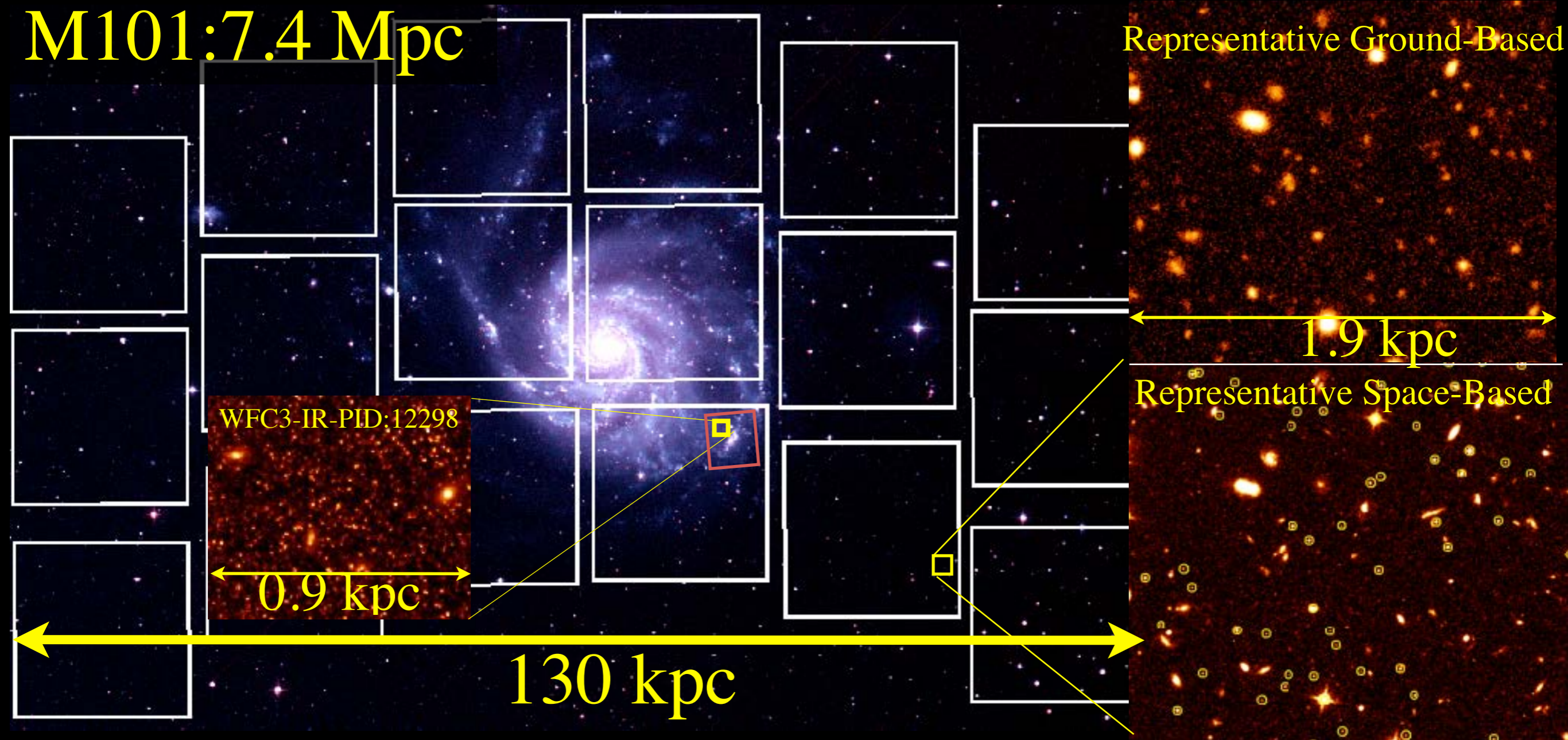
Roman's Nearby Potential



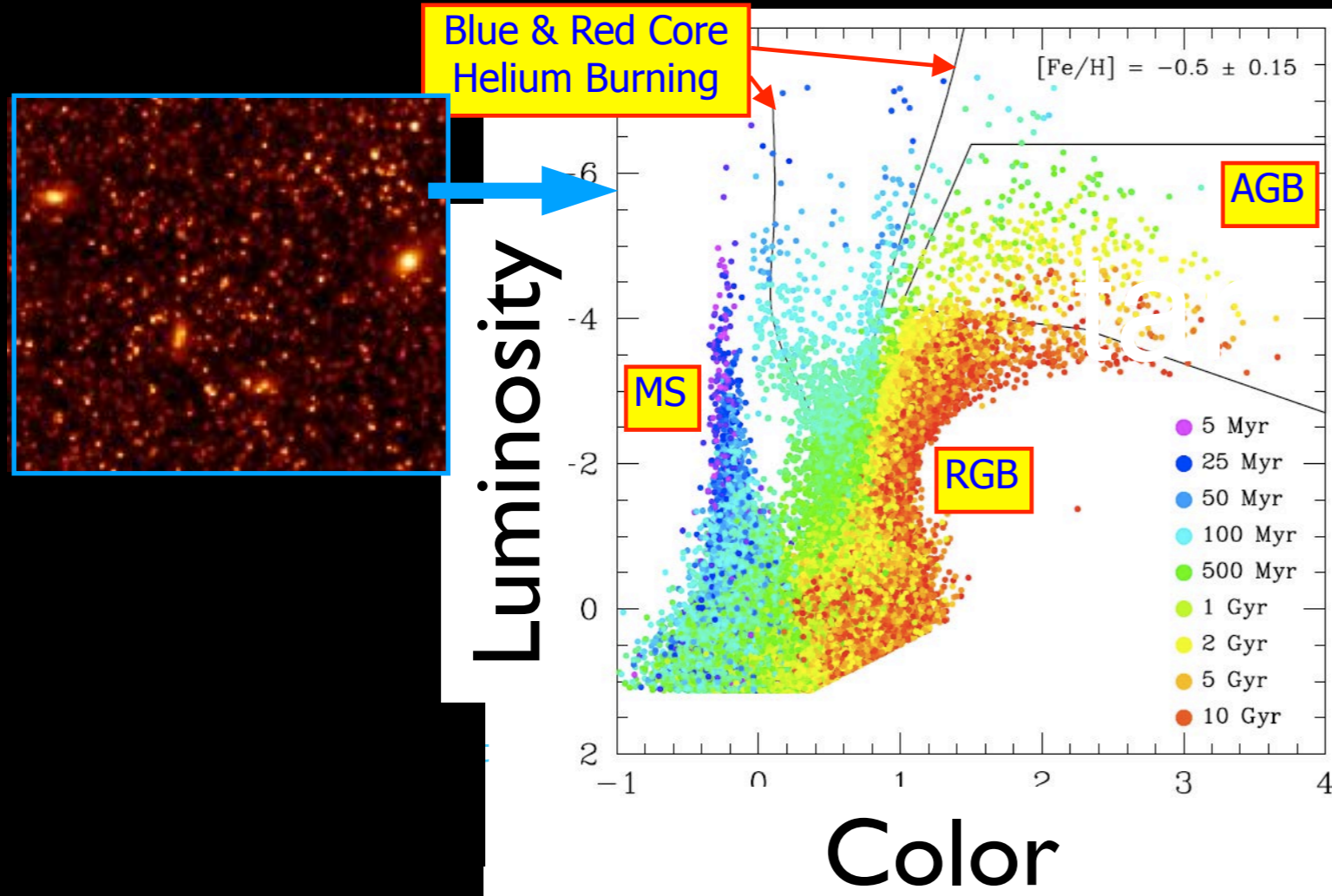
Roman's Nearby Potential



Stellar Halos with Roman



The Story is in the Stars



HST optical CMD,
color-coded by age

They generically tag the ages of past events, along with the associated masses and energies

Stellar Halo Structures

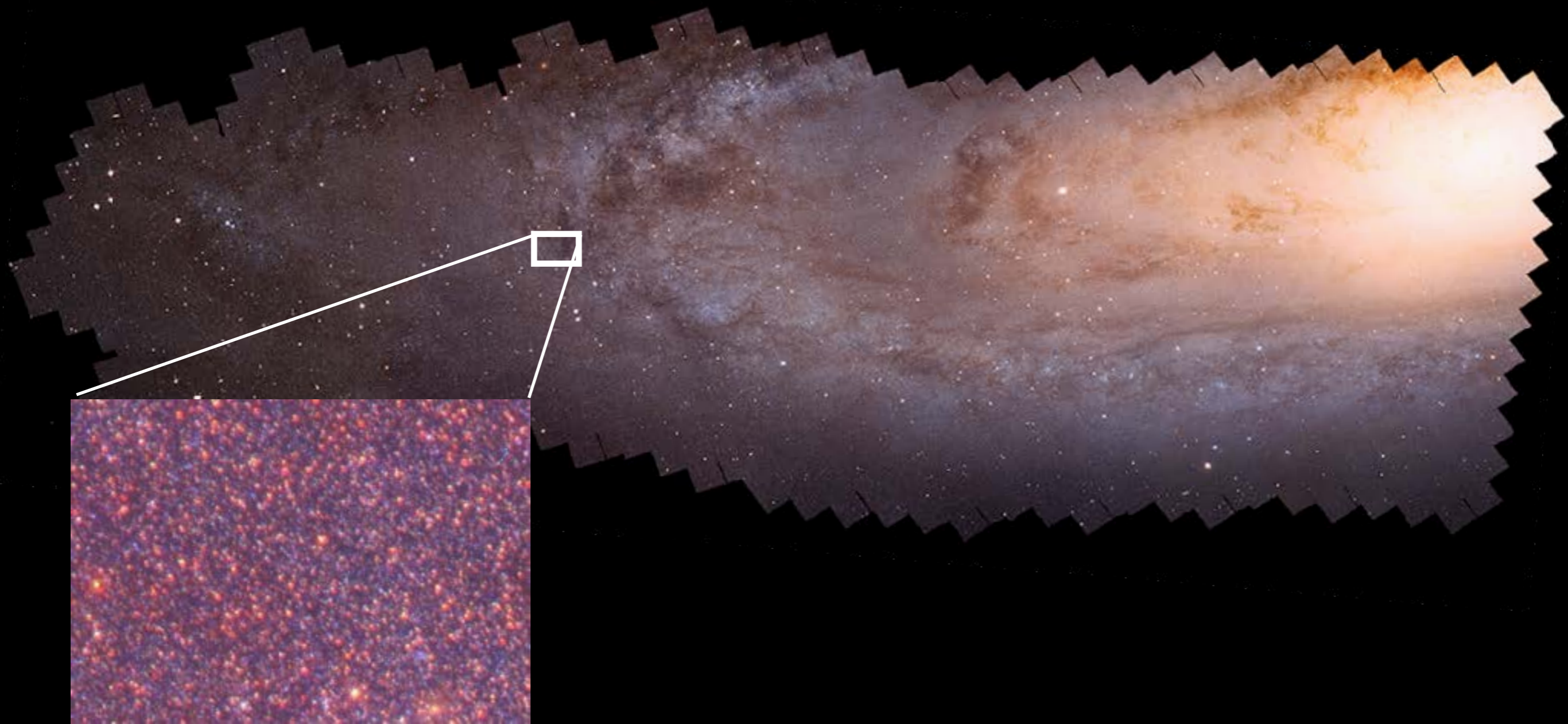


Number, luminosity, shape of streams \rightarrow Types, timing and orbits of galaxies accreted.
Disrupted streams \rightarrow Small-scale dark matter halos.

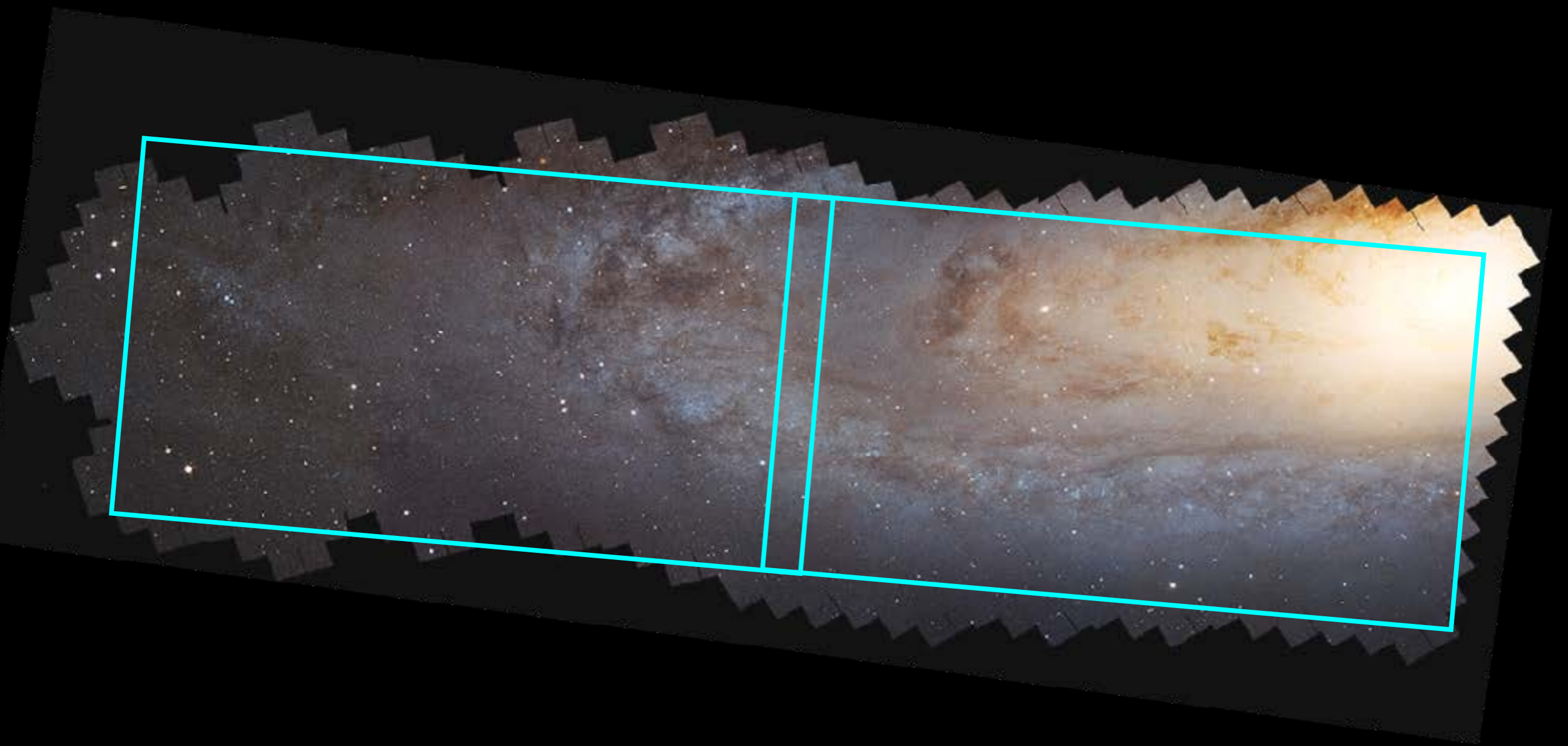
414 Hubble Pointings



414 Hubble Pointings



2 Roman Pointings

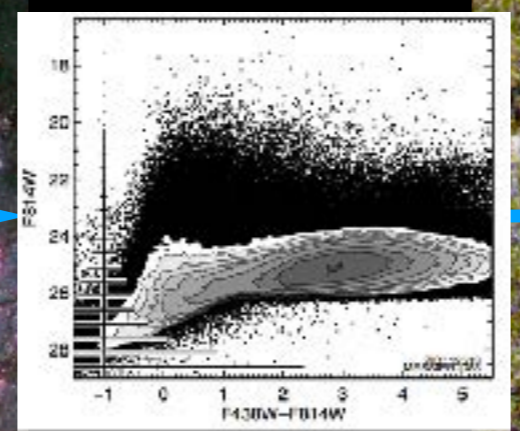
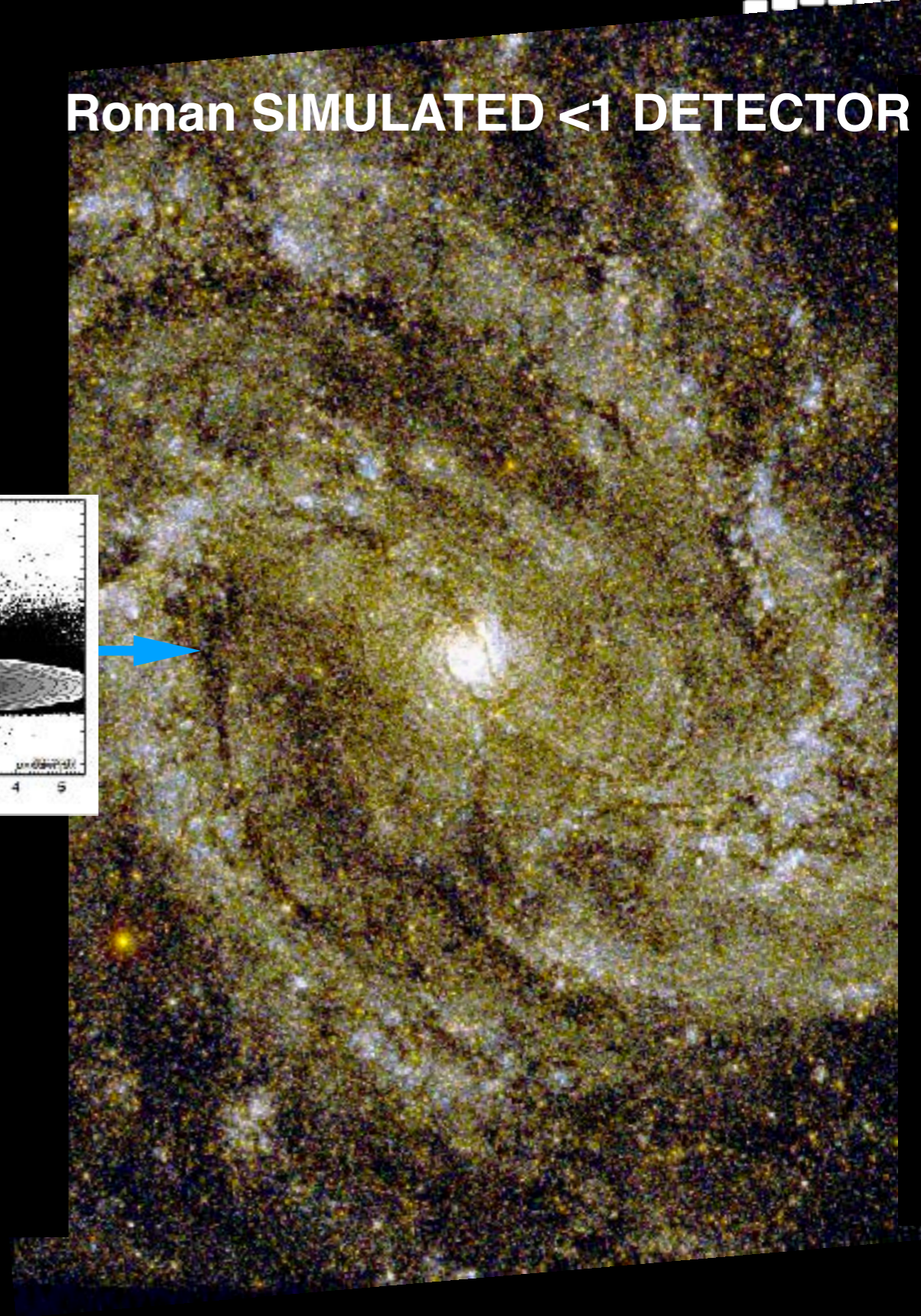


HST 7 POINTINGS

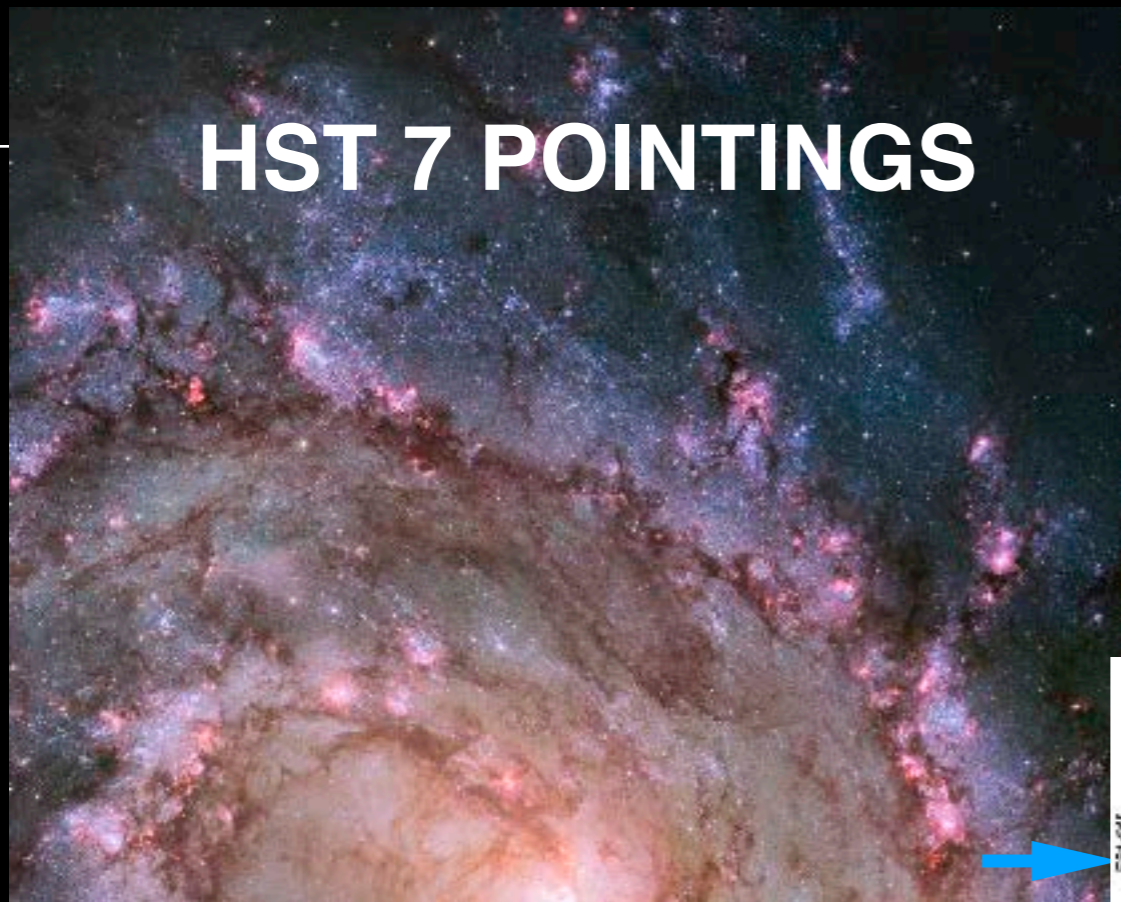


Blair et al. 2014

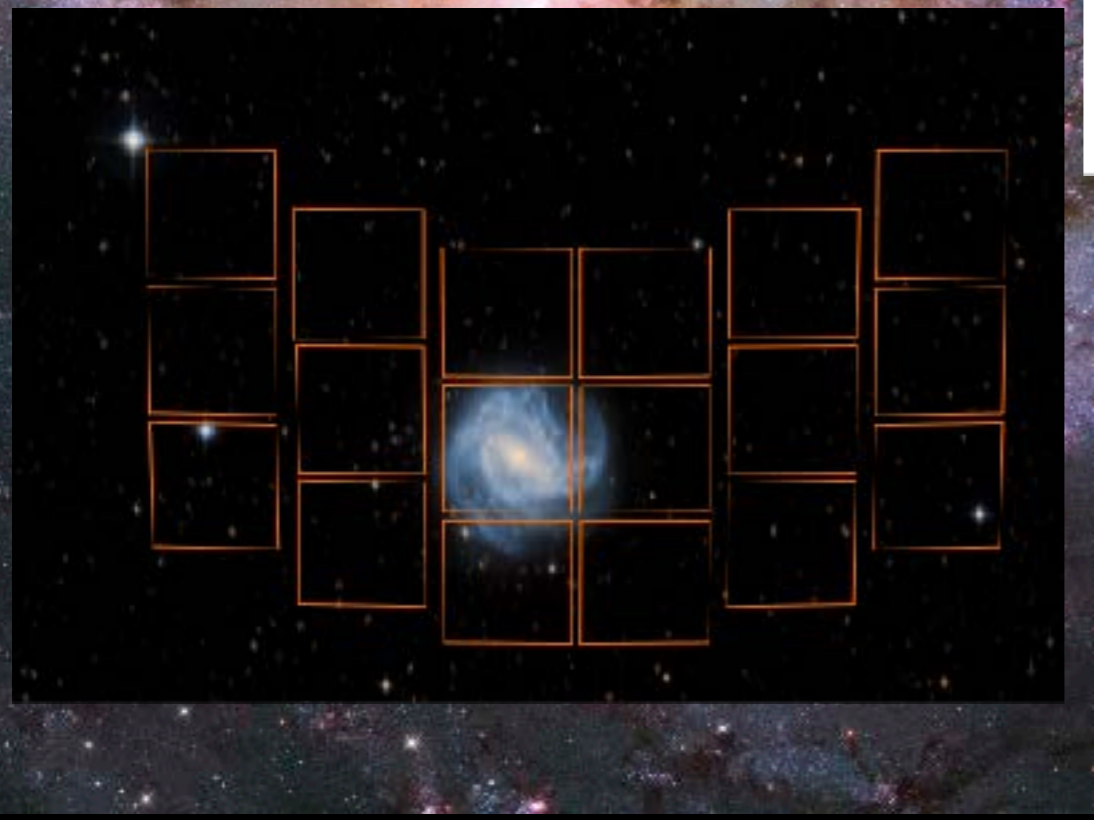
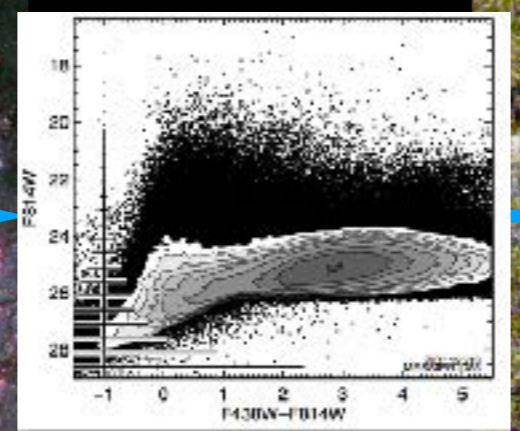
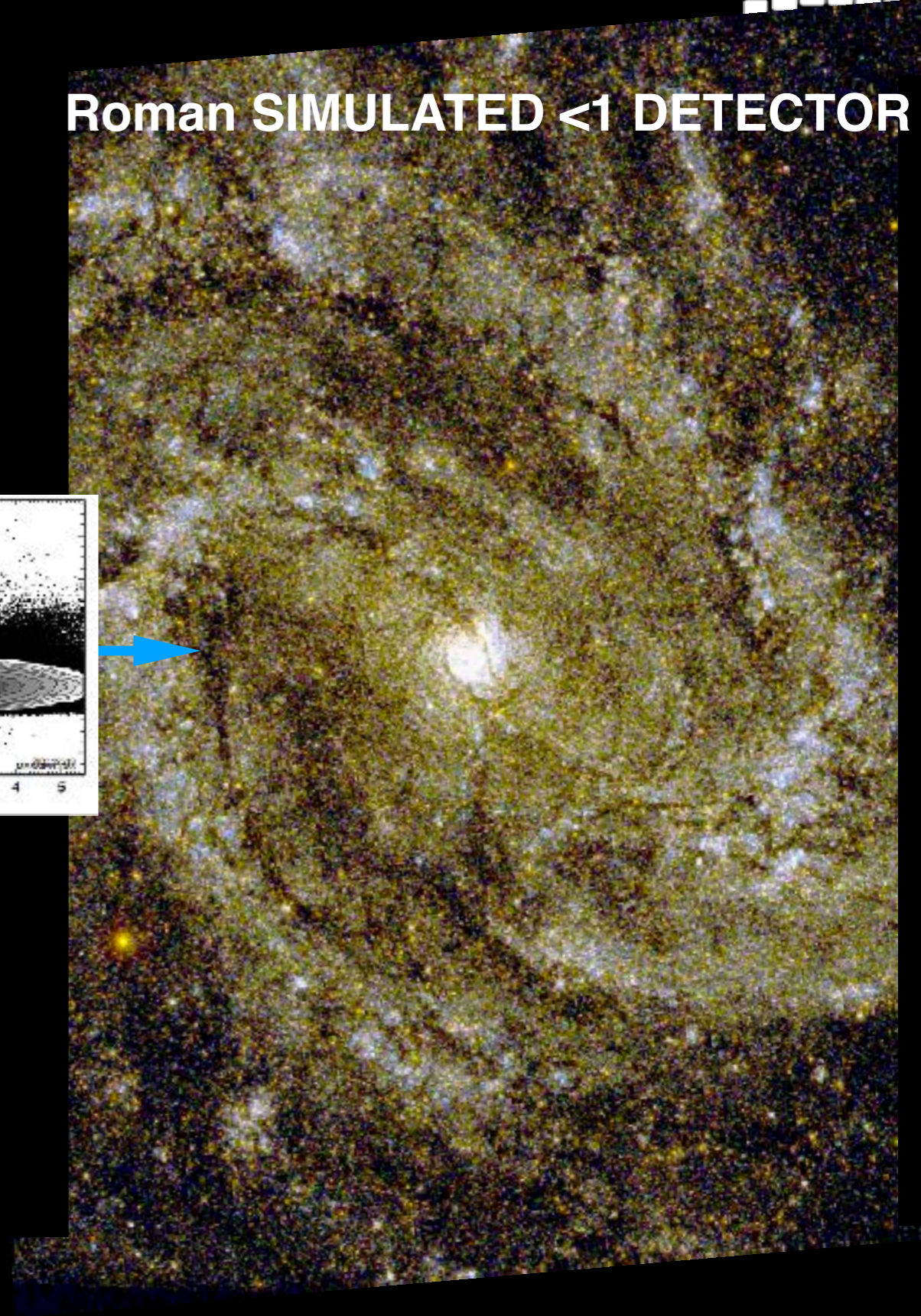
Roman SIMULATED <1 DETECTOR

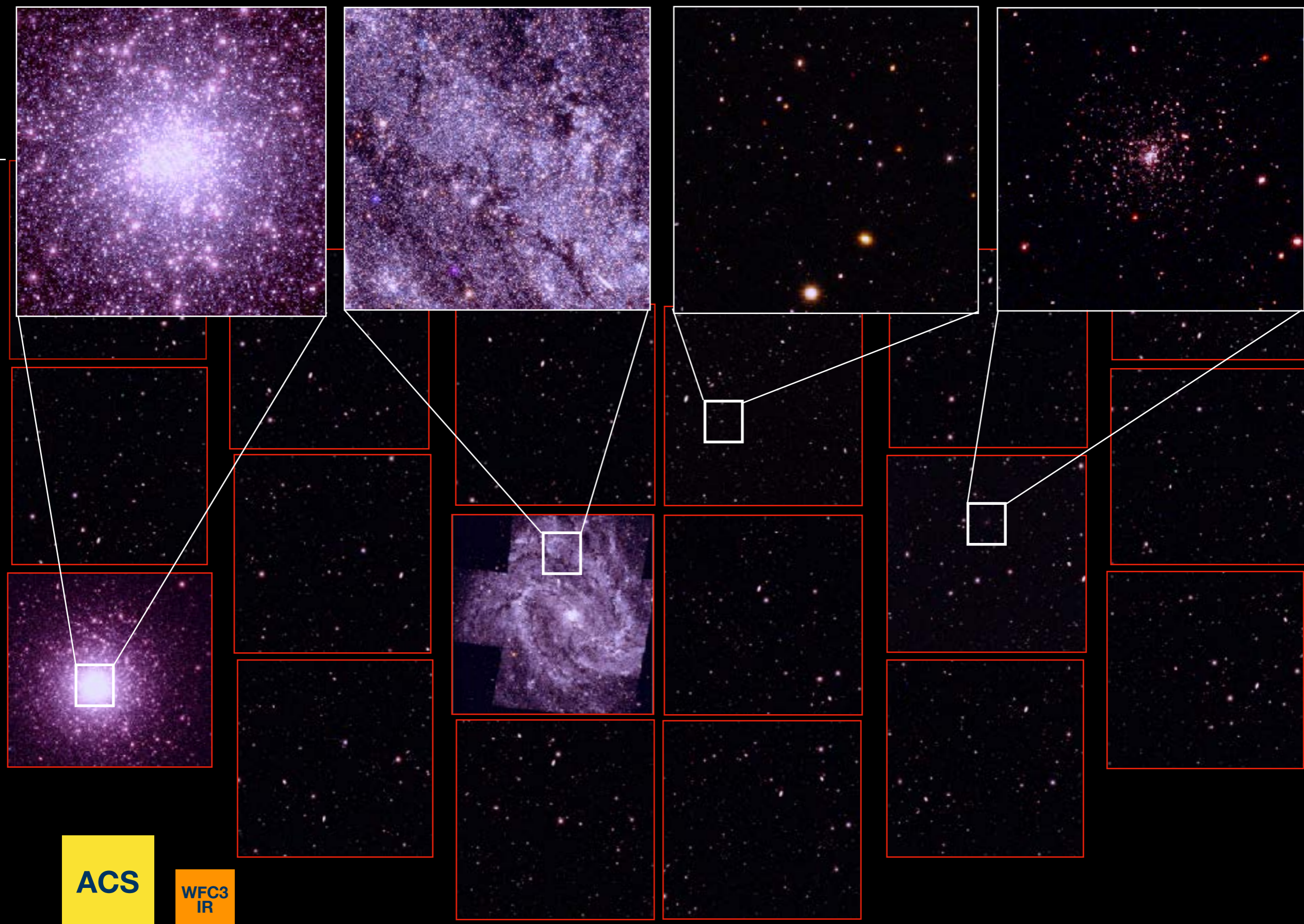


HST 7 POINTINGS

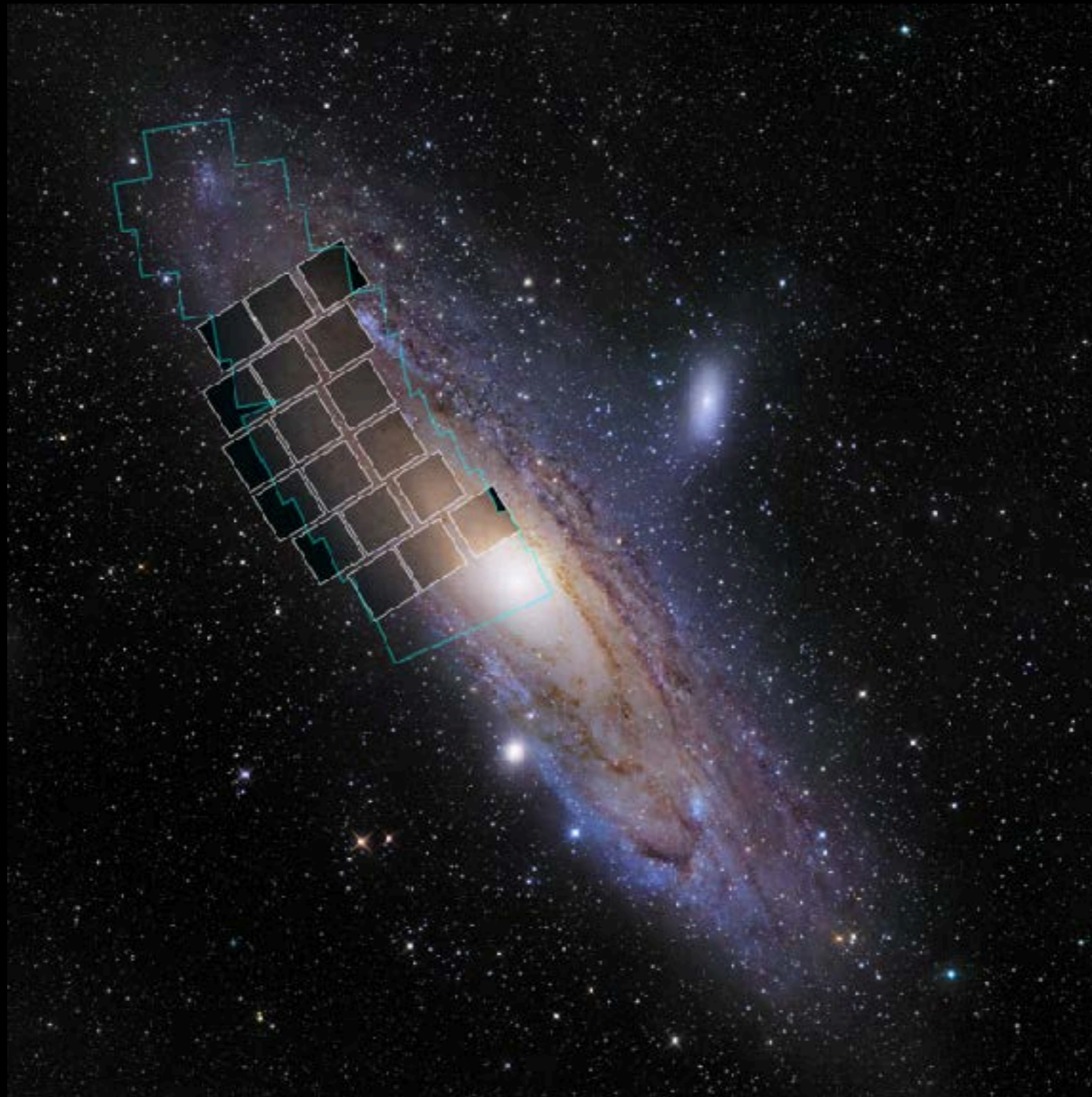


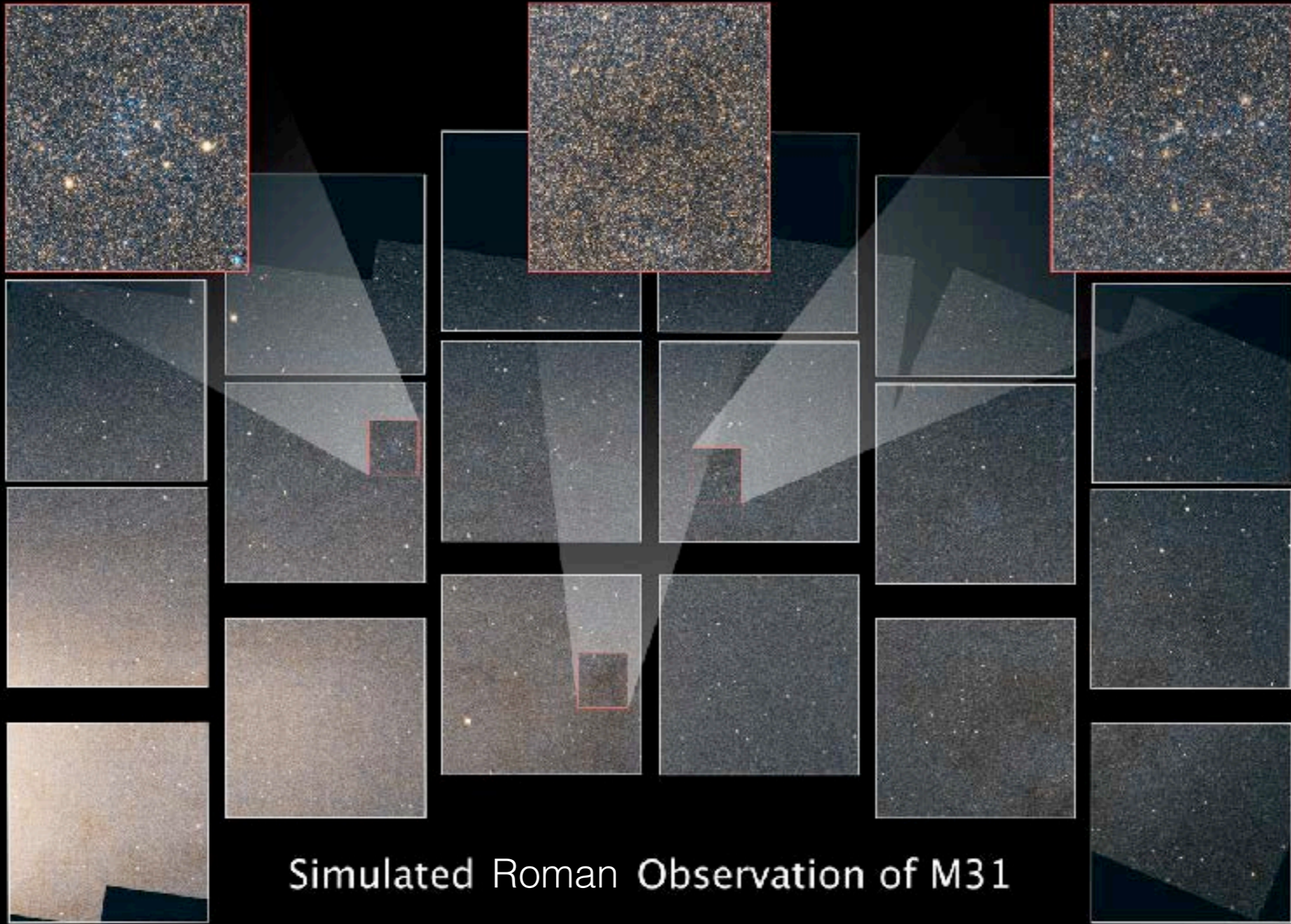
Roman SIMULATED <1 DETECTOR





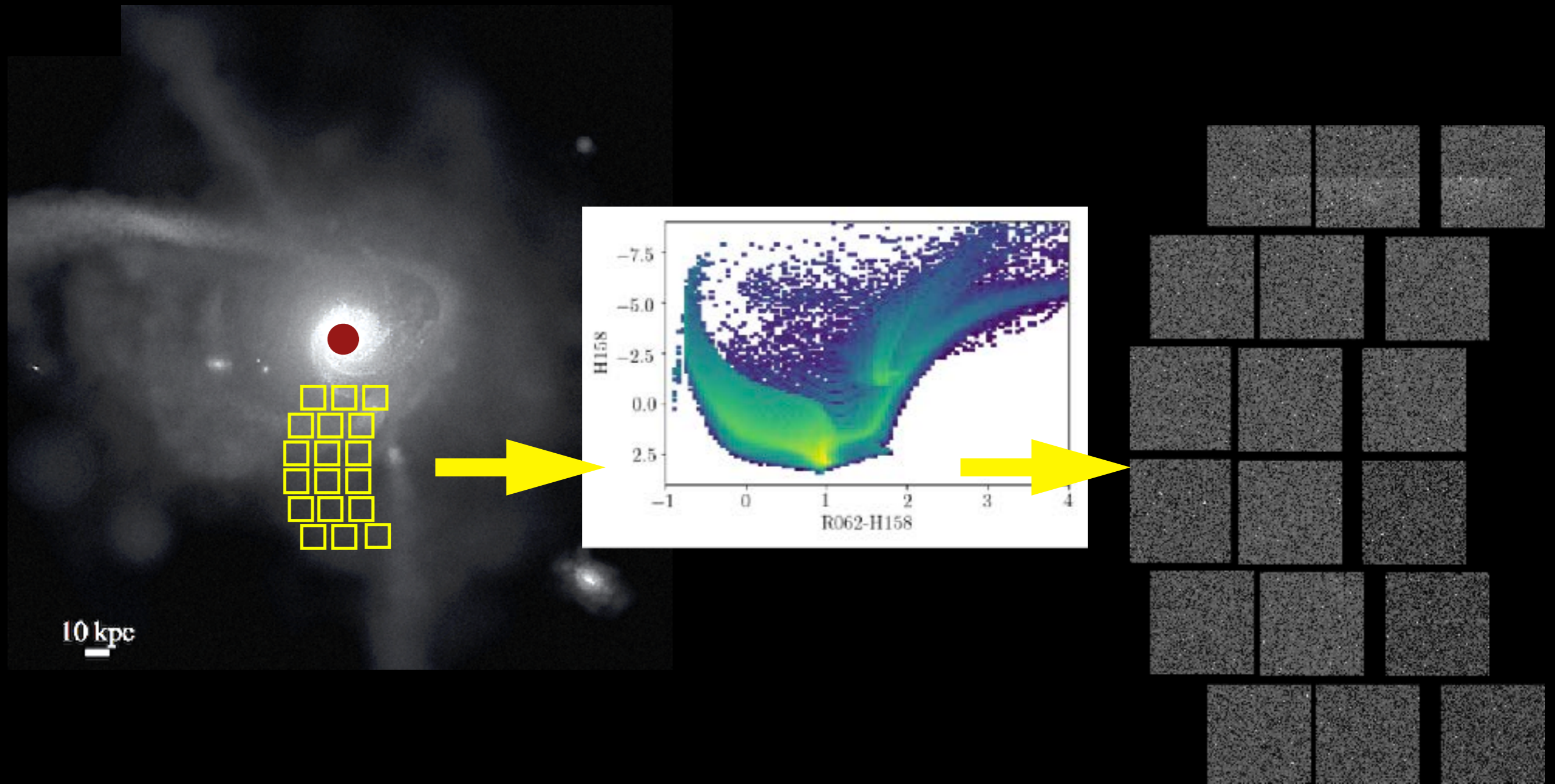
Near-field science overview figure; Akeson et al. 2019





Simulated Roman Observation of M31

Roman Imaging of FIRE Simulations

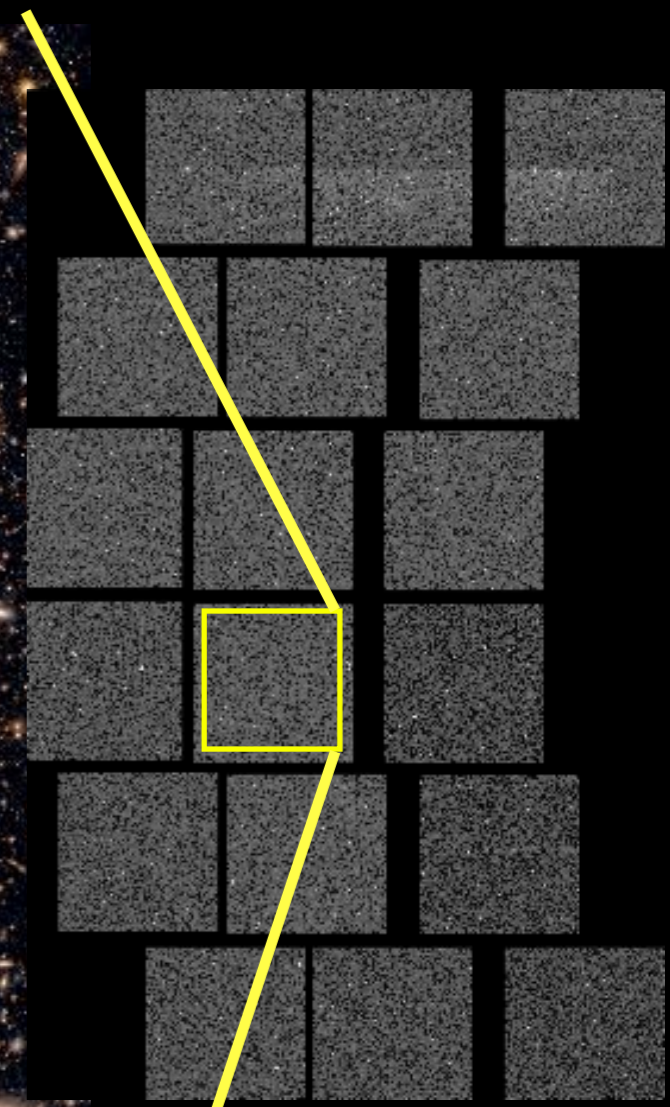
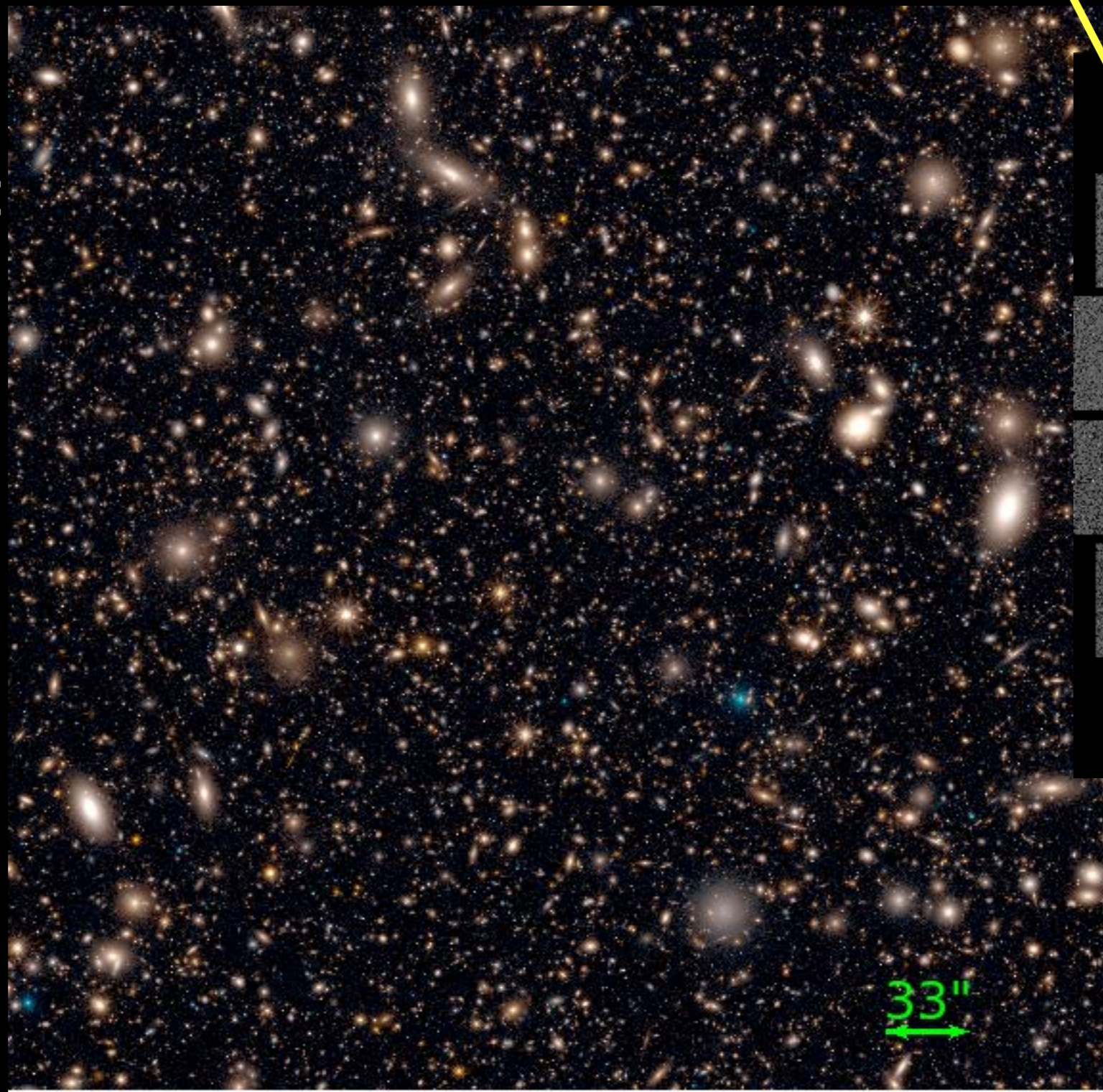


Halo populations by [Robyn Sanderson](#) (see Sanderson et al. 2020)

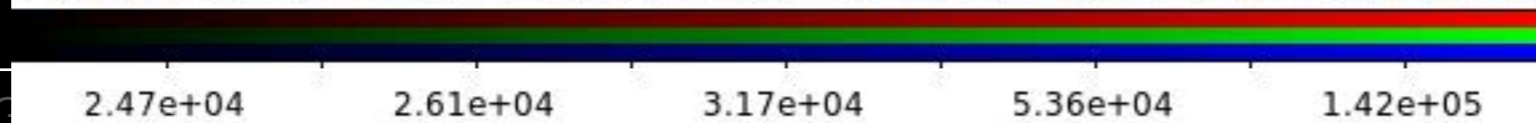
Simulating Halo Images

Background:
CANDELS-
based
catalogs

Stars:
Galaxia
catalogs
of
simulations



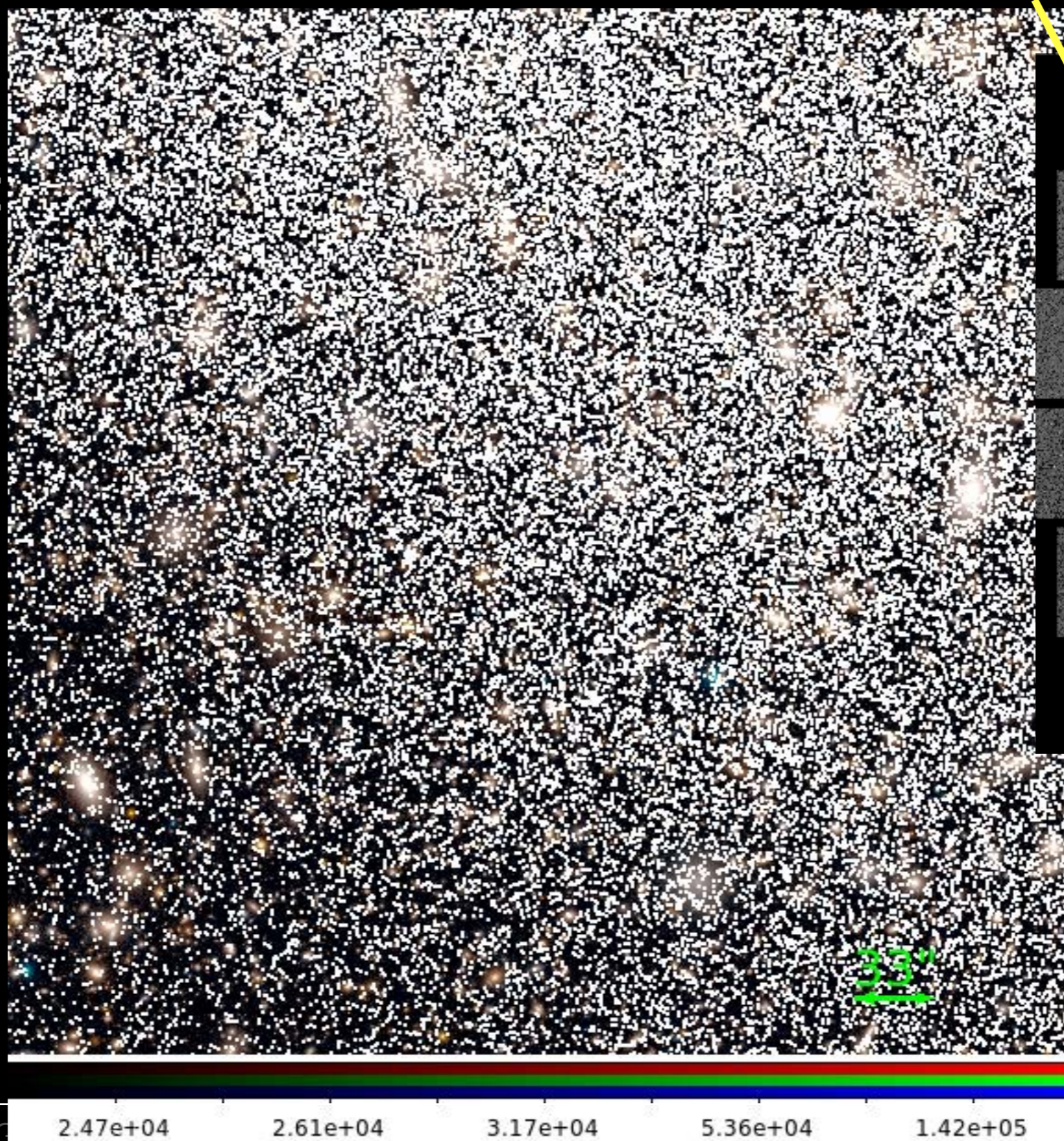
Blue = Z087
Red = H158



Simulating Halo Images

Background:
CANDELS-
based
catalogs

Stars:
Galaxia
catalogs
of
simulations



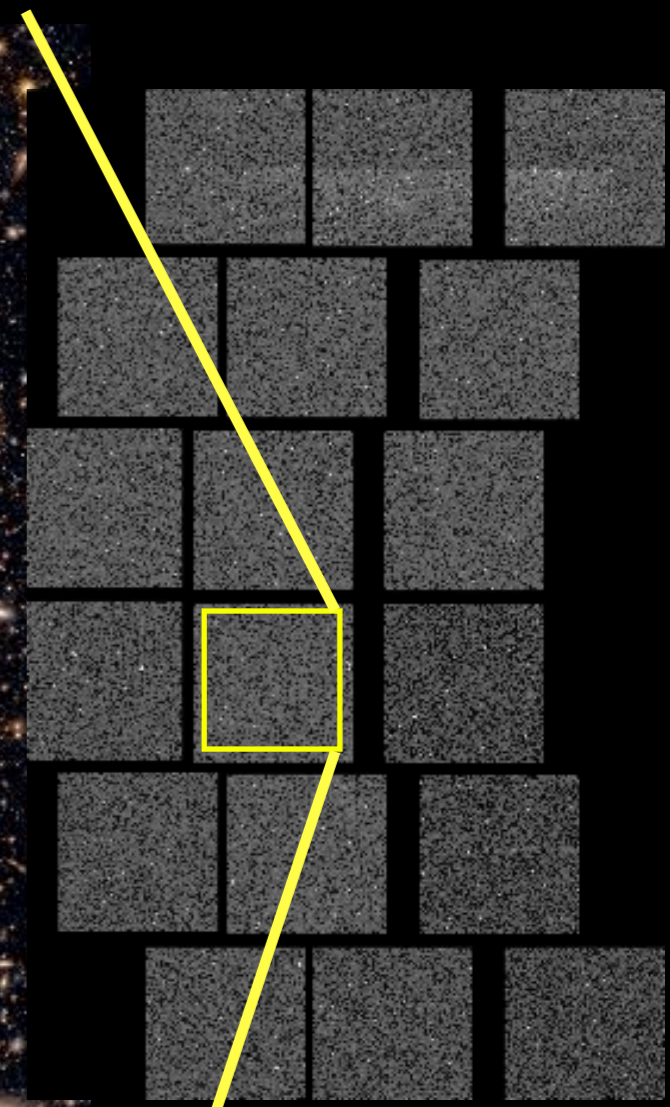
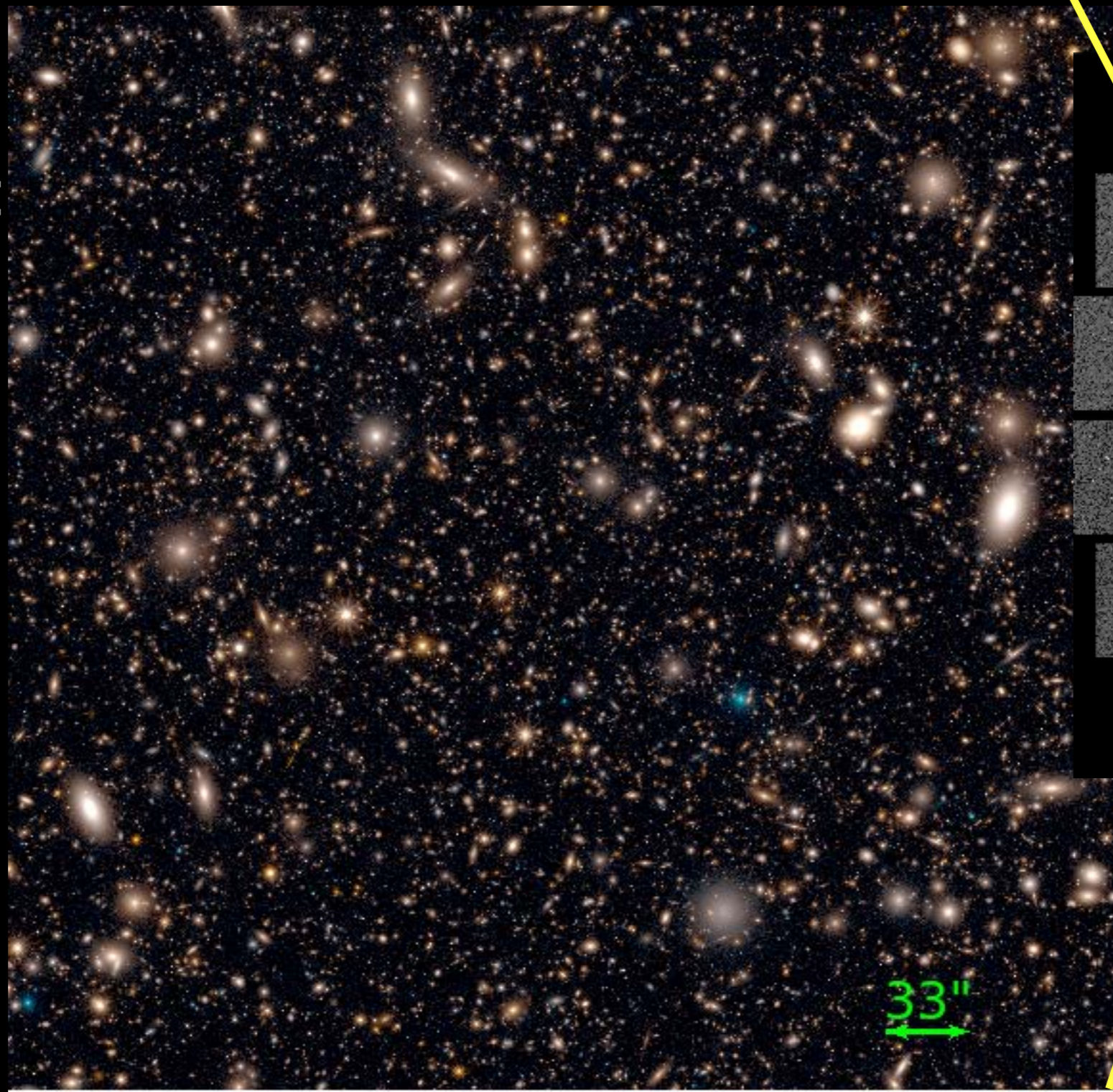
Blue = Z087
Red = H158

Stars in
a Halo

Simulating Halo Images

Background:
CANDELS-
based
catalogs

Stars:
Galaxia
catalogs
of
simulations



Blue = Z087
Red = H158

Projects and Lead Co-Is

PI: Williams (U. Wash.)

Deputy PI: Dalcanton (U. Wash.)

Postdoc: Adrien Thob (U.Wash.)

And many more collaborators!

Photometry	Dolphin (Raytheon)
Stellar Halos	Bell (Mich.), Johnston (Columbia), Bullock (UCI), Mandel (Columbia)
Dwarf Satellites	Sand (UA), Bullock (Irvine)
Small Scale Dark Matter	Walker (CMU), Kervick (CMU), Johnston (Columbia)
Globular Clusters	Seth (Utah)
Simulating Color Magnitude Diagrams	Weisz (Berkeley), Sanderson (UPenn)
Dust & ISM	Gordon (STScI)
Stellar Evolution	Girardi (INAF), Boyer (STScI)

Providing Tools for the Community

- wingspipe: event-based pipeline software package (A. Thob, <https://github.com/benwl/WINGS>)
- DOLPHOT: Roman subpackage for crowded-field photometry (A. Dolphin, <http://americano.dolphin-sim.com/dolphot/>)
- PARSEC: Stellar evolution models in Roman bands (L. Girardi, <http://stev.oapd.inaf.it/cgi-bin/cmd>)
- walter: Predicting star counts for Roman observations (L. Lancaster, <https://github.com/lancaster/walter>)
- SCUDS: detecting and classifying halo substructure from catalogs (D. Hendel, <https://github.com/davidhendel/scuds>)
- HSS: Finding streams in catalogs (S. Pearson, <https://github.com/sapearson/HSS>)
- STIPS: Generating simulated science-quality Roman images from input catalogs (STScI, <https://github.com/spacetelescope/STScI-STIPS>)