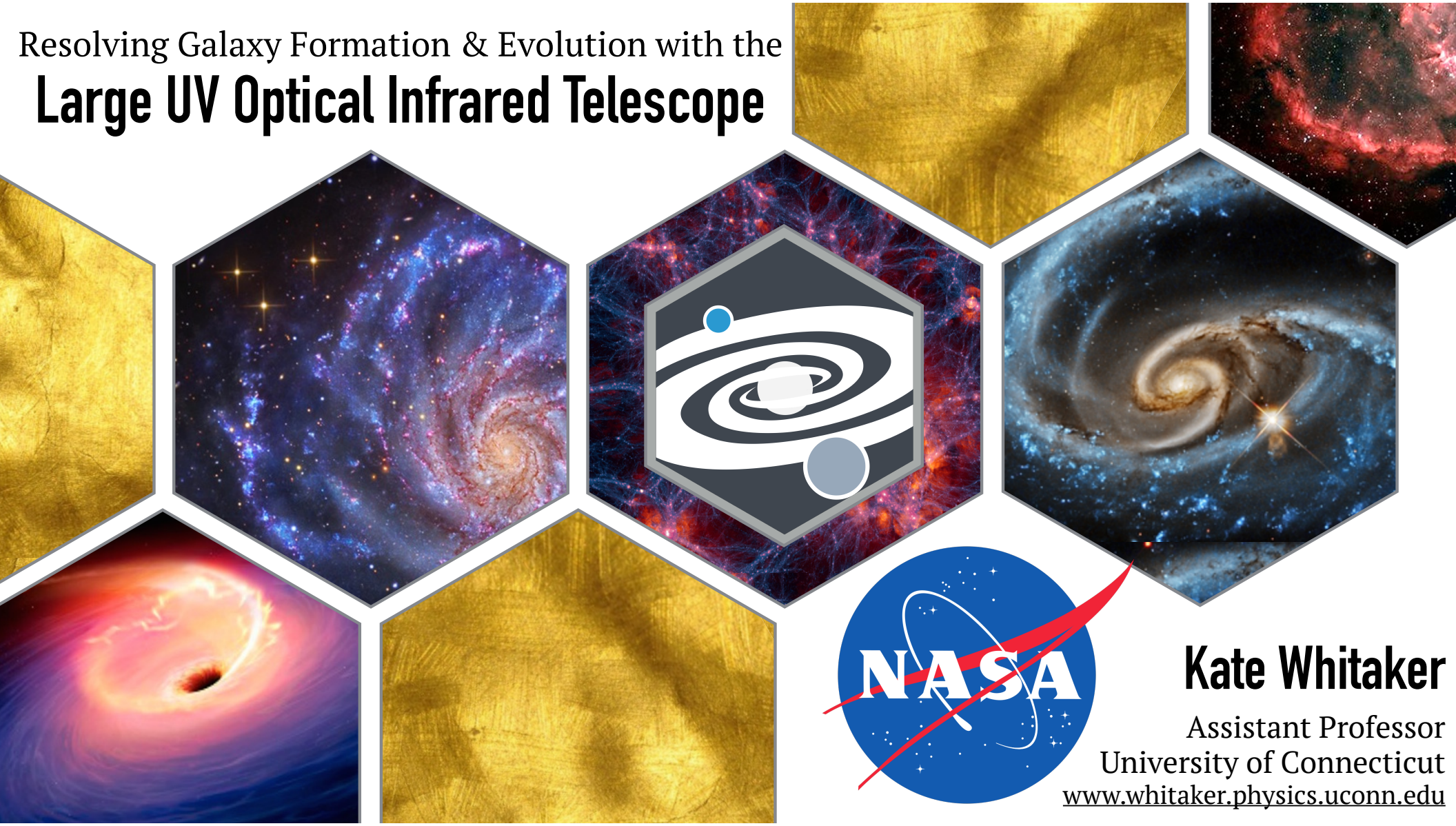
Resolving Galaxy Formation & Evolution with the

Large UV Optical Infrared Telescope



Kate Whitaker

Assistant Professor
University of Connecticut
www.whitaker.physics.uconn.edu

1. Order of magnitude improvement in **resolution**
2. Vastly improved **sensitivity** and instrumentation
3. Broad **wavelength coverage**, extending UV to NIR

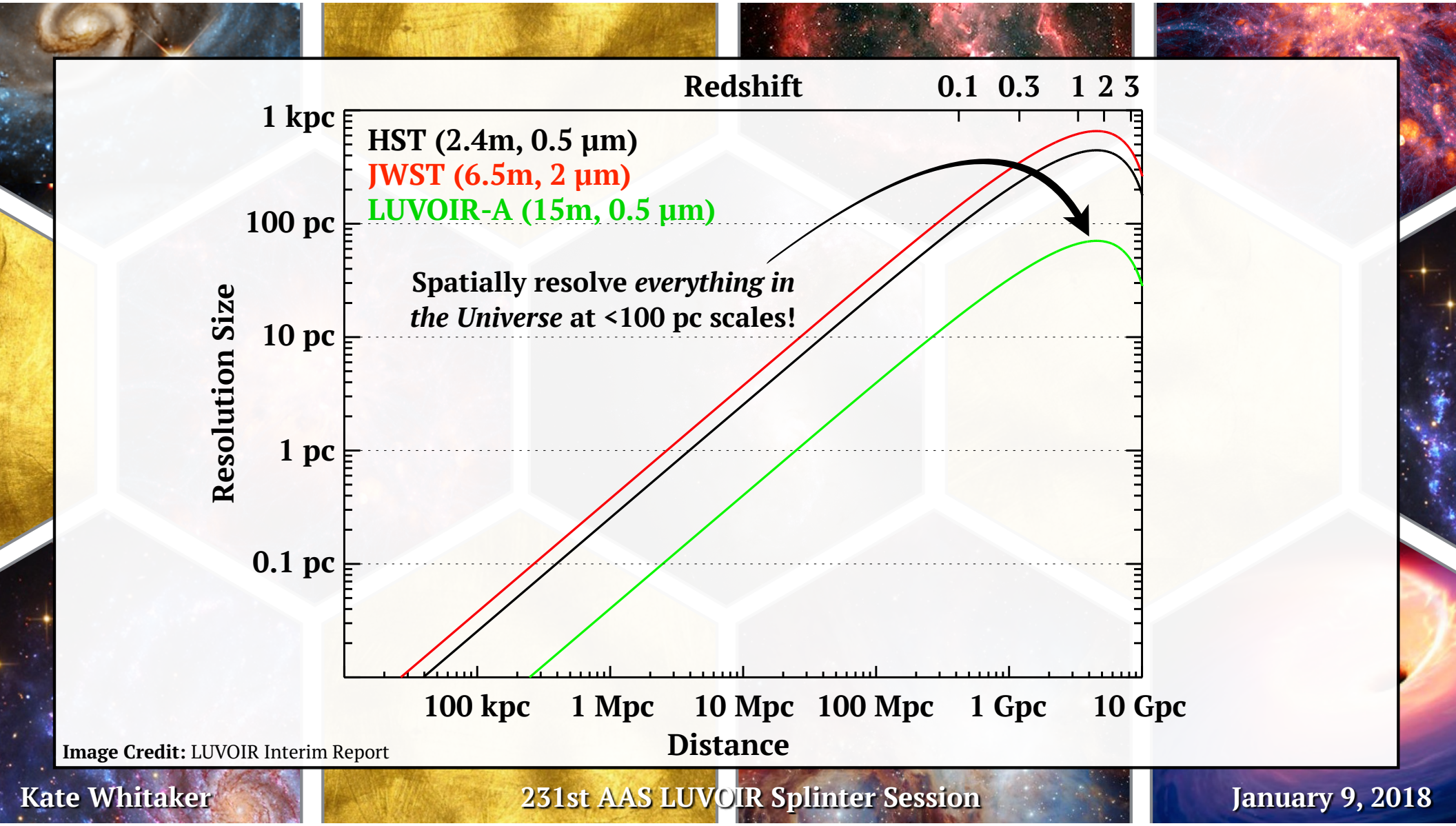
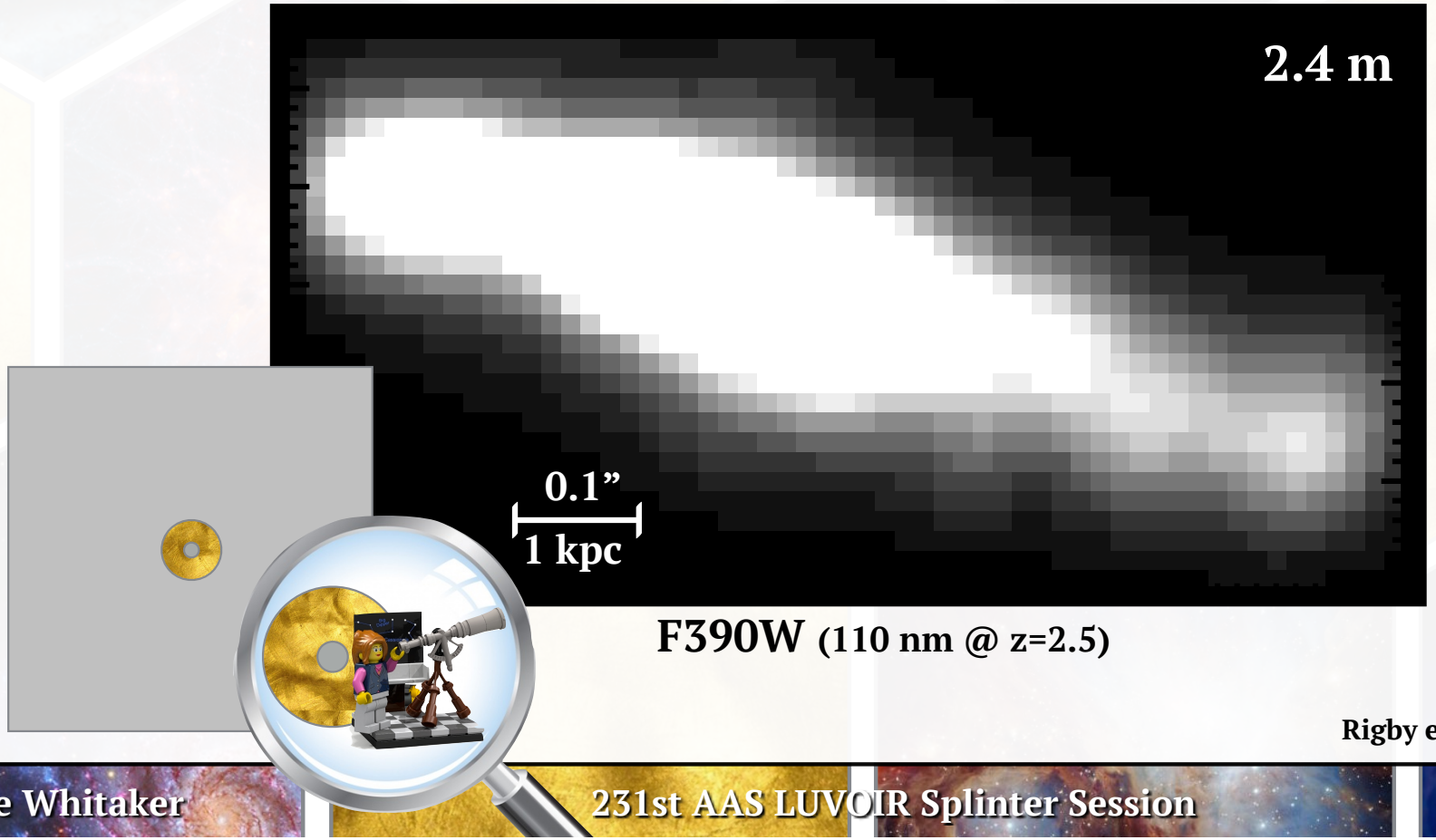


Image Credit: LUVOIR Interim Report

Star-forming Galaxy at z=2.5



F390W (110 nm @ z=2.5)

Rigby et al. 2017, ApJ, 843:79

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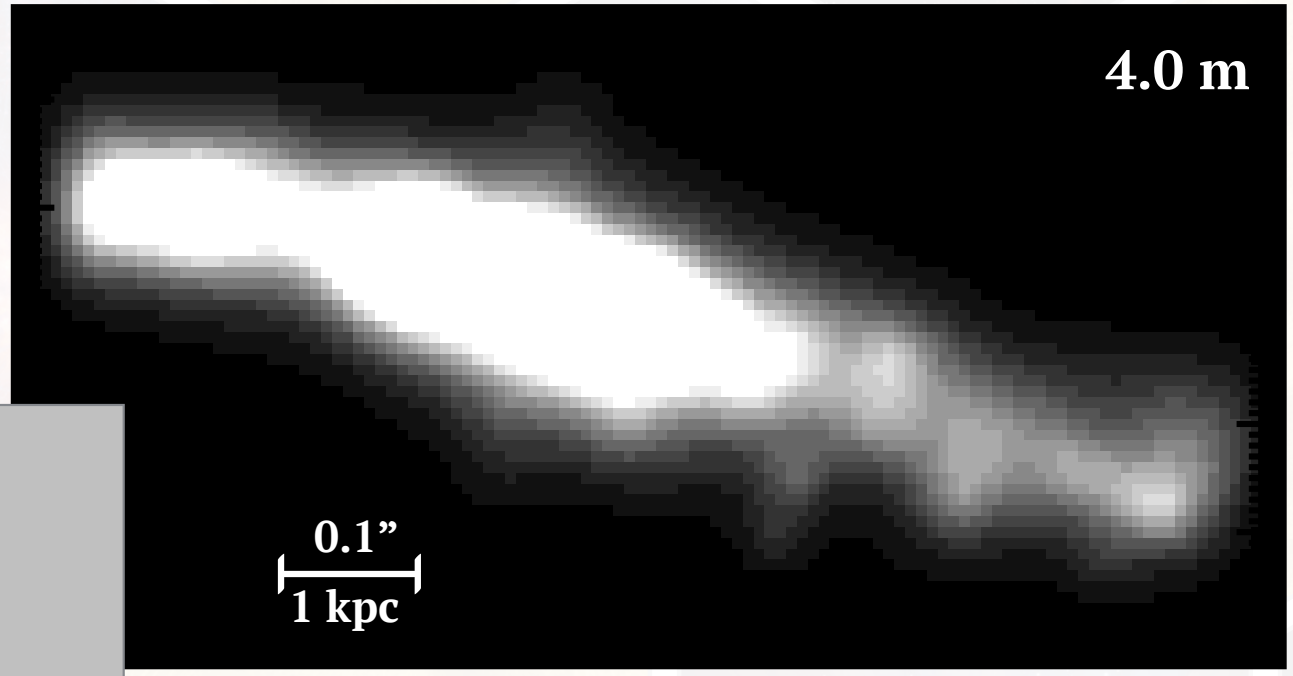

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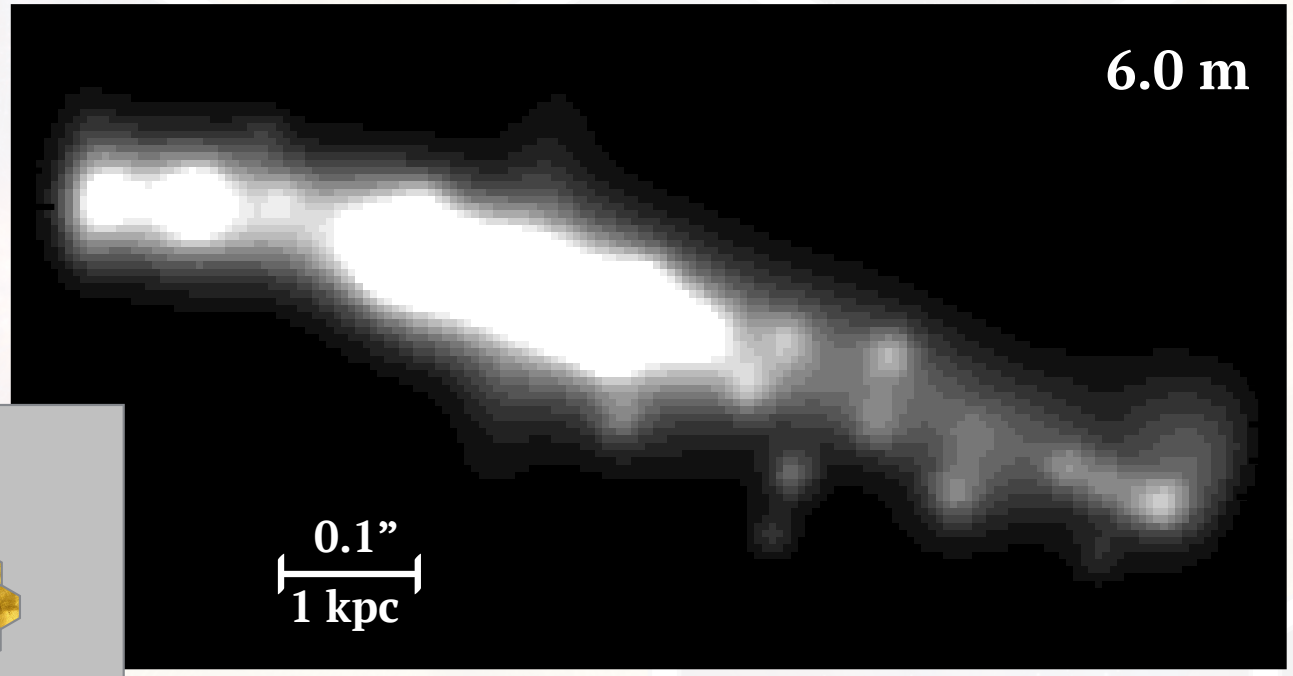

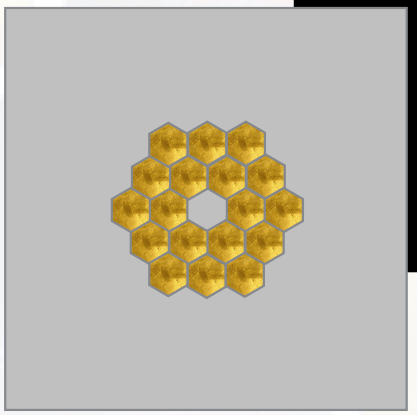

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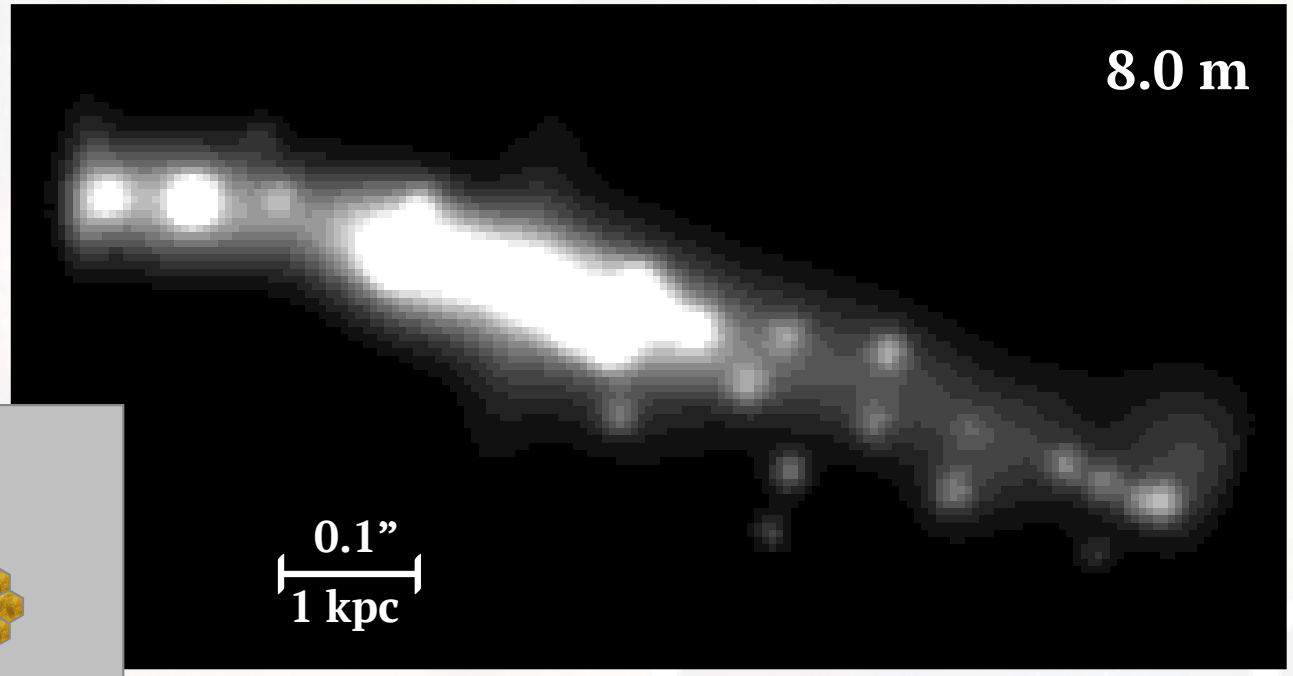

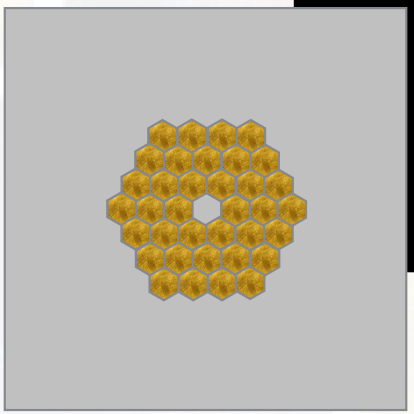

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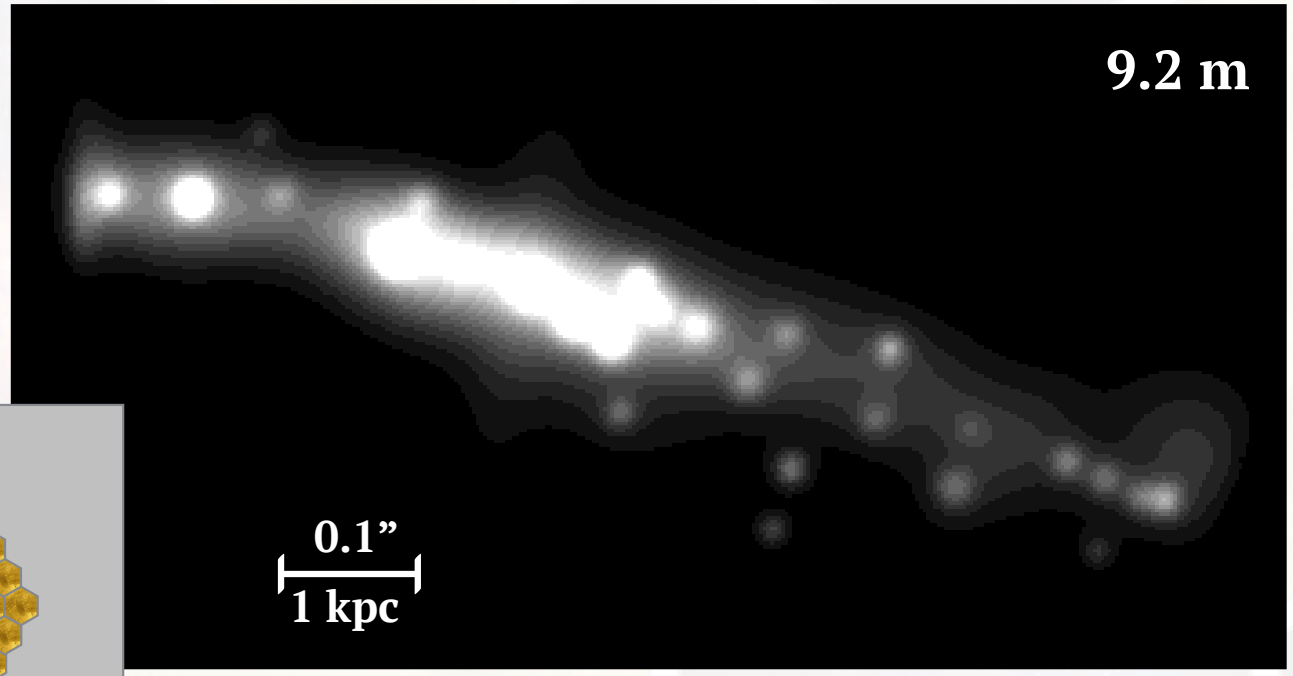

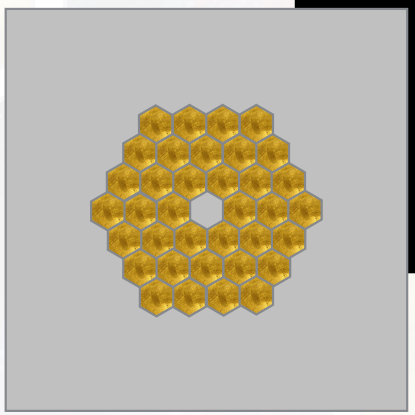

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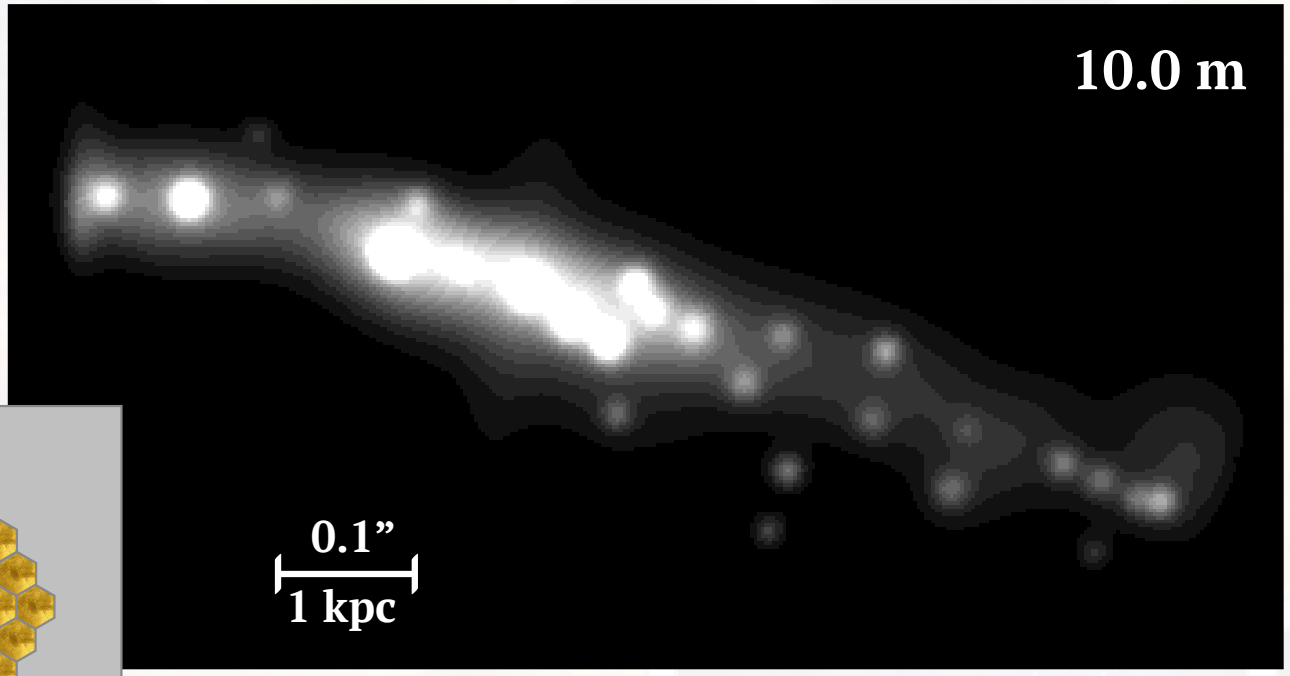

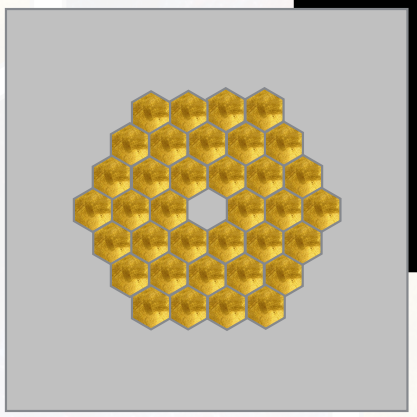

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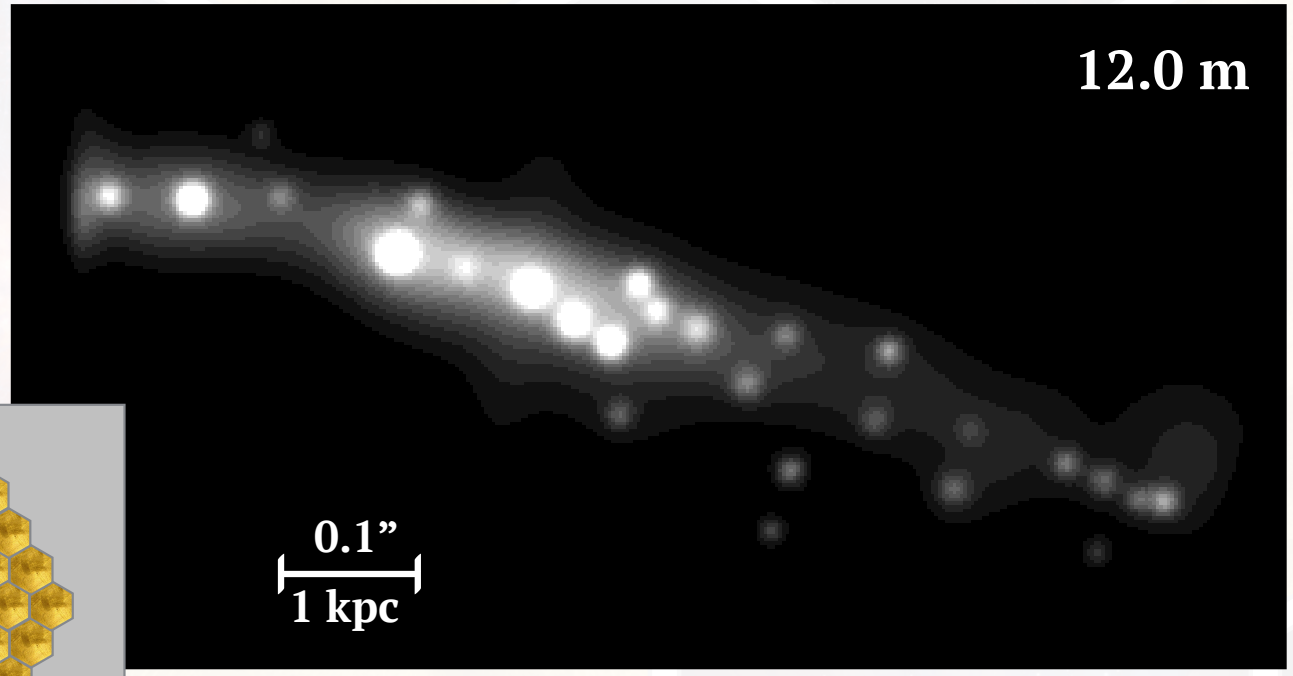

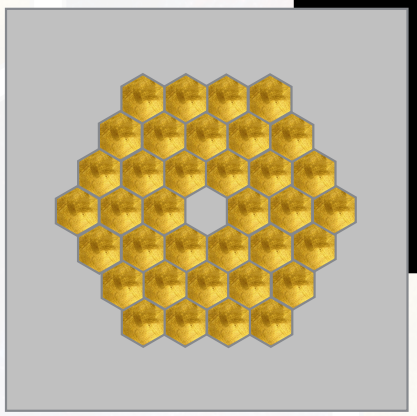

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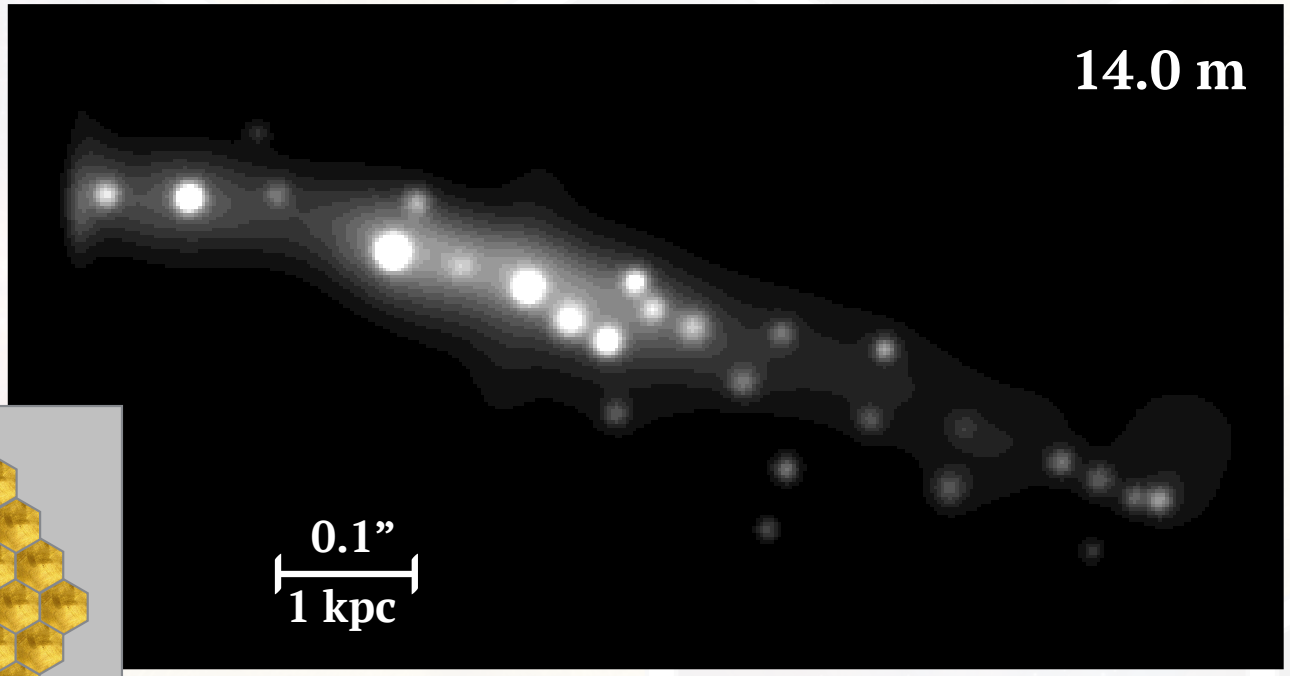

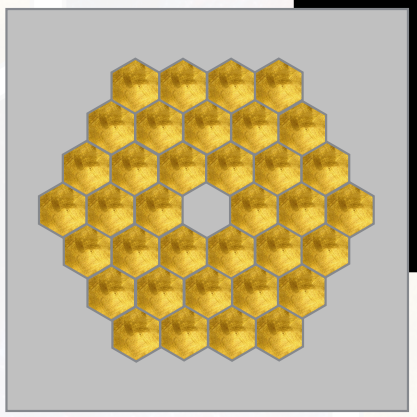

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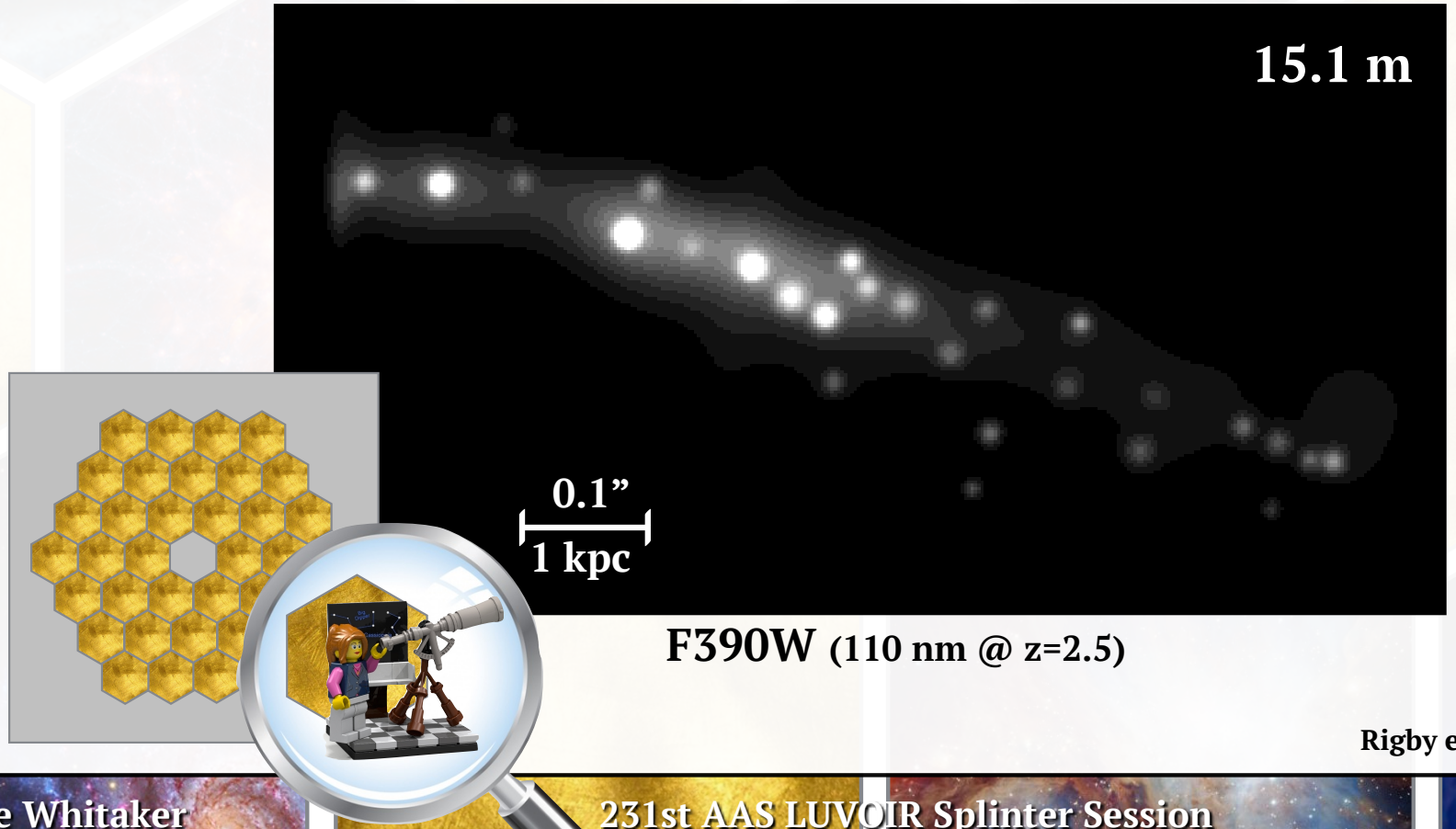

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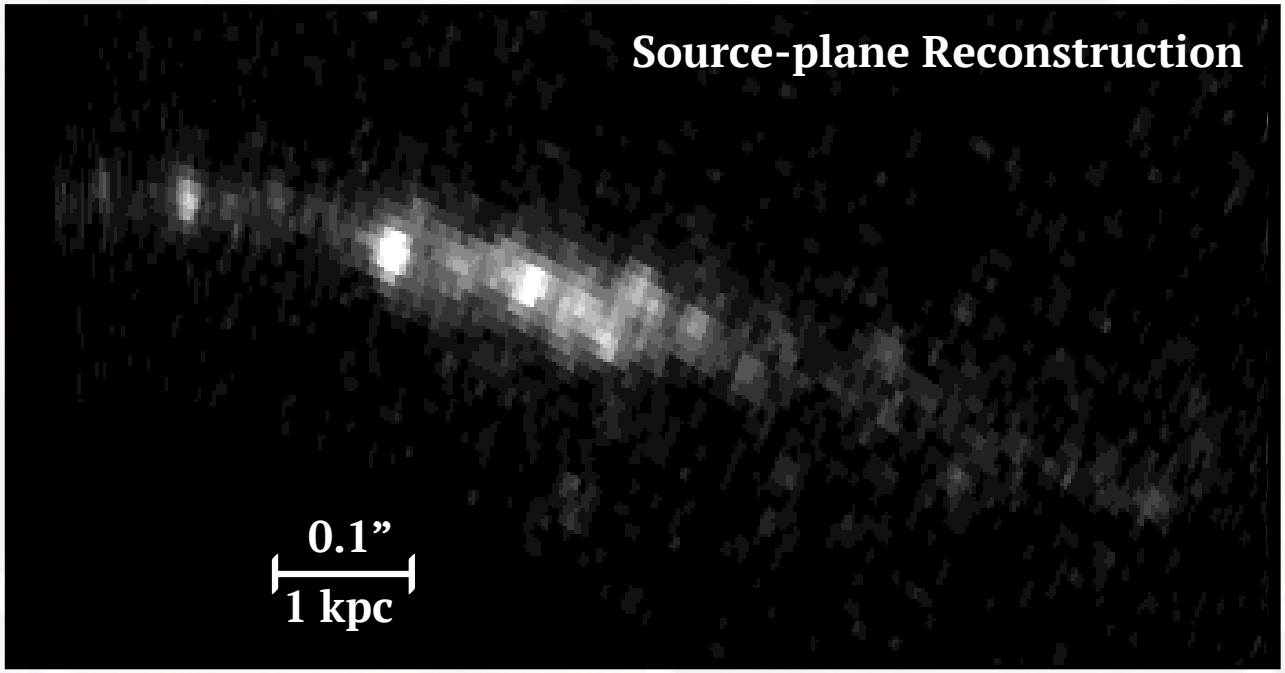

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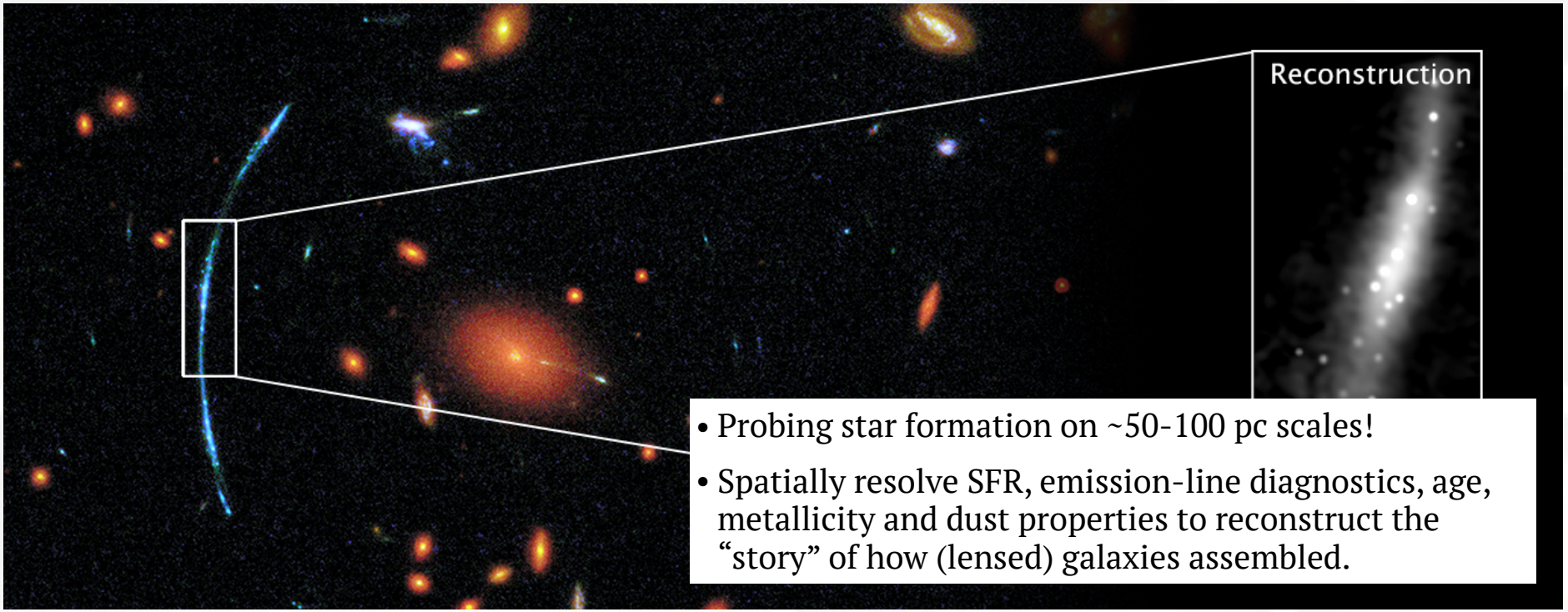
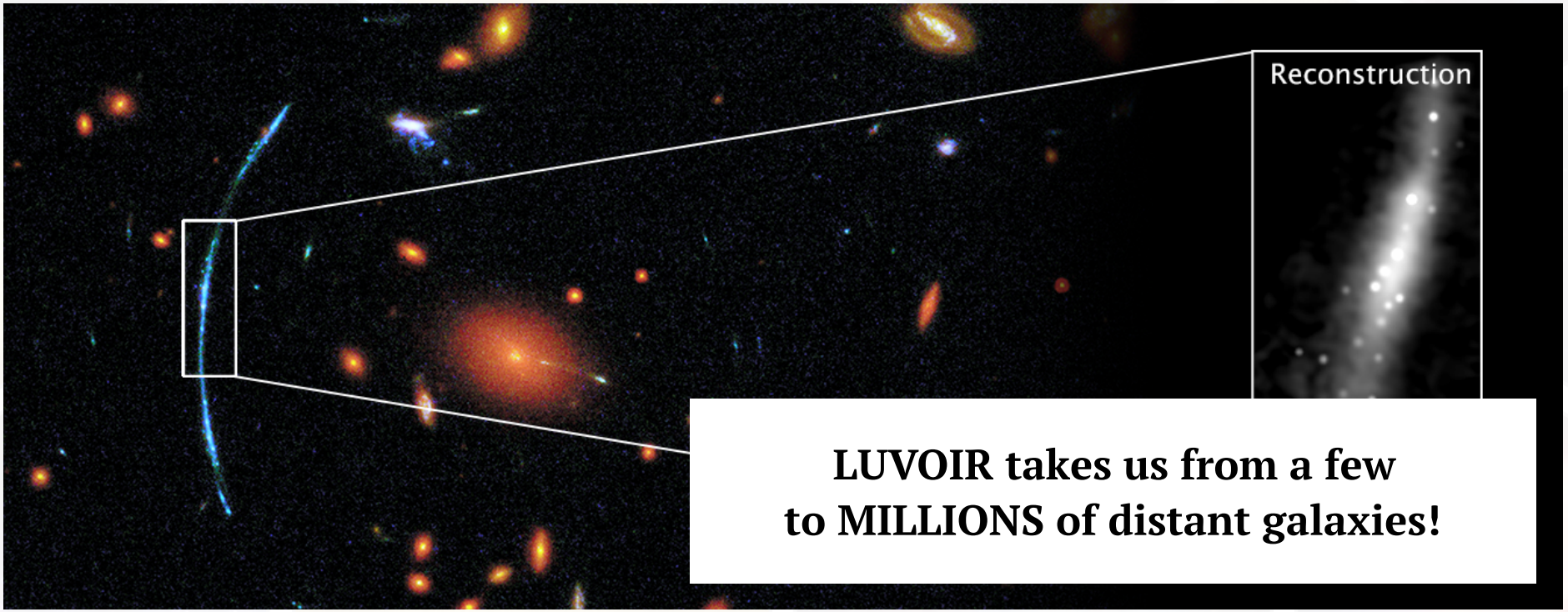


- Probing star formation on ~50-100 pc scales!
- Spatially resolve SFR, emission-line diagnostics, age, metallicity and dust properties to reconstruct the "story" of how (lensed) galaxies assembled.

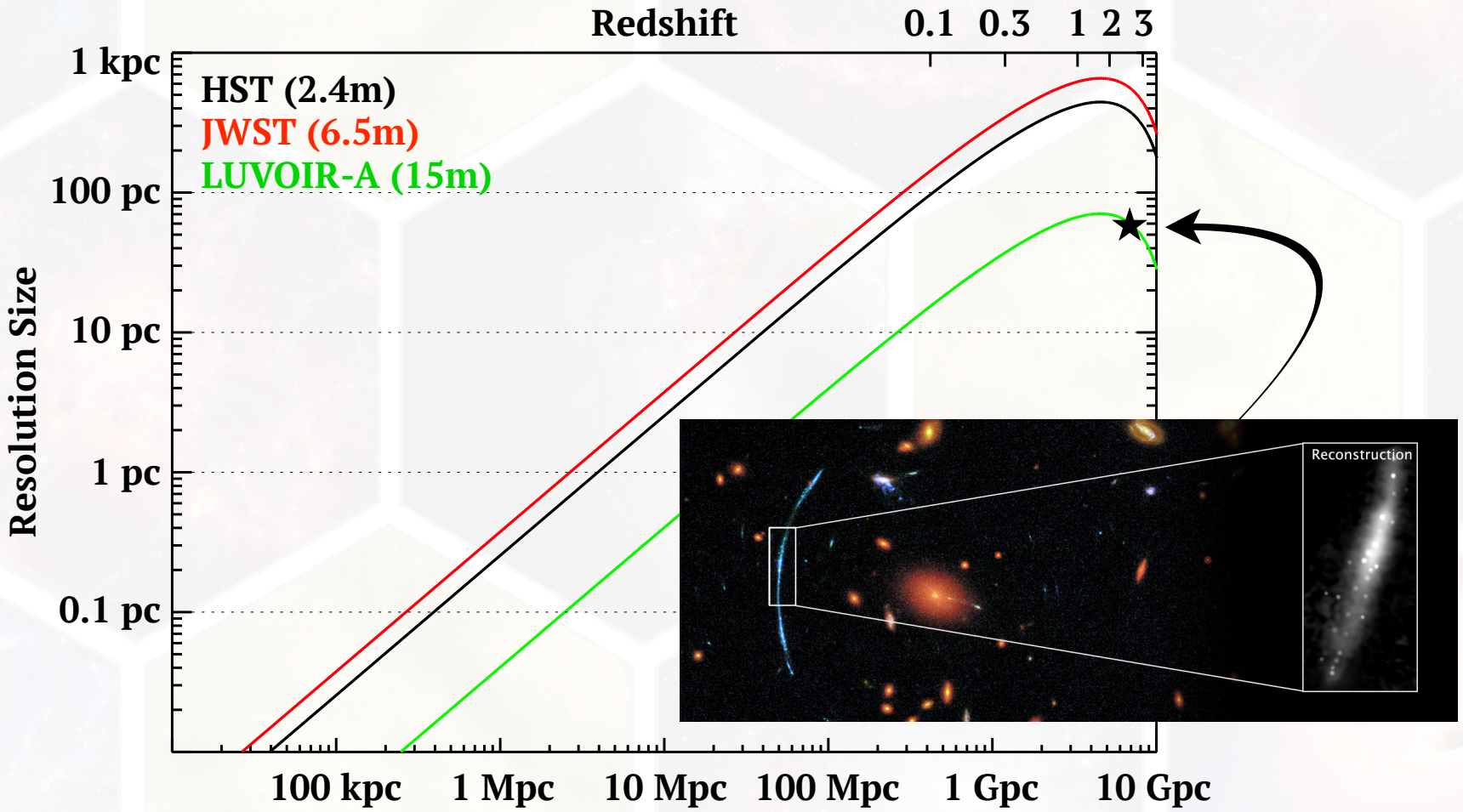
Johnson et al. 2017, ApJ, 843:78

Star-forming Galaxy at z=2.5

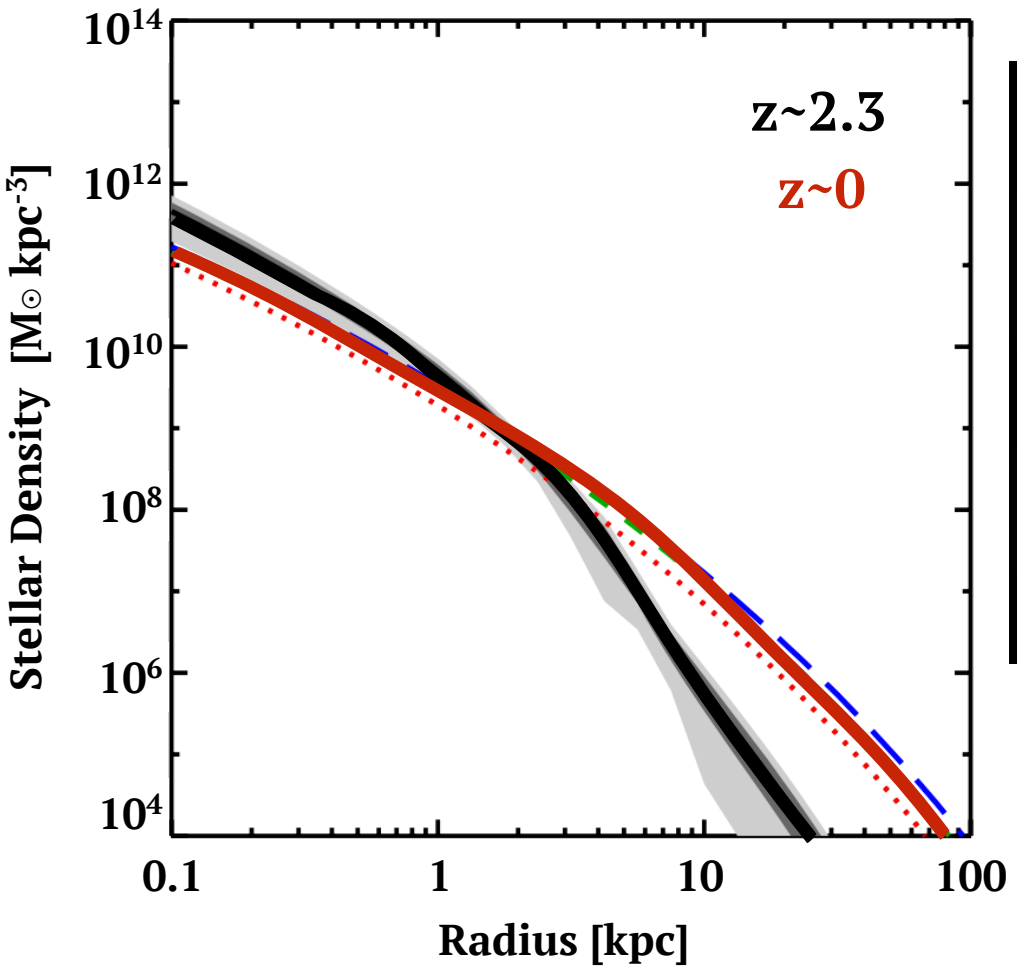


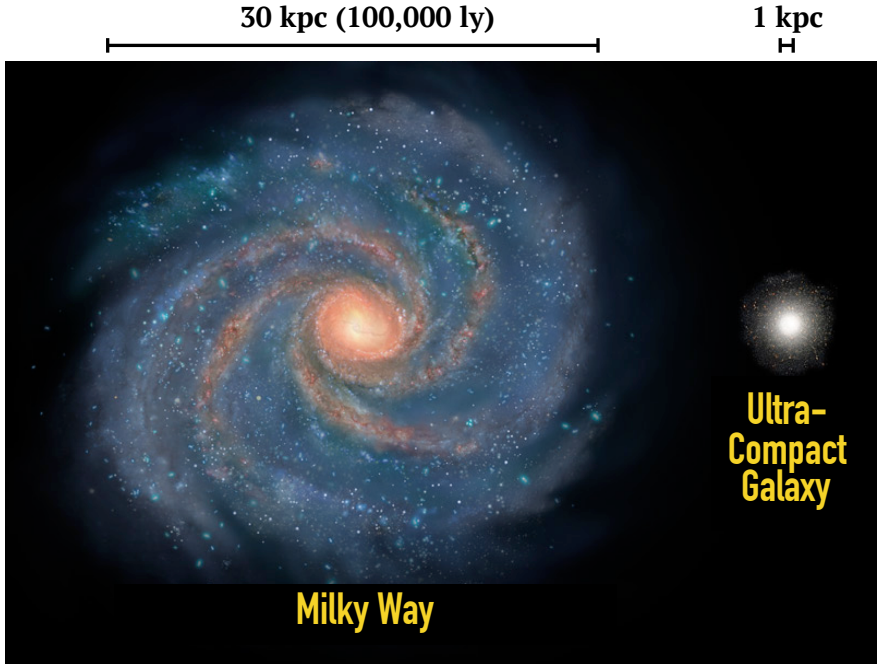
LUVOIR takes us from a few to MILLIONS of distant galaxies!

Johnson et al. 2017, ApJ, 843:78



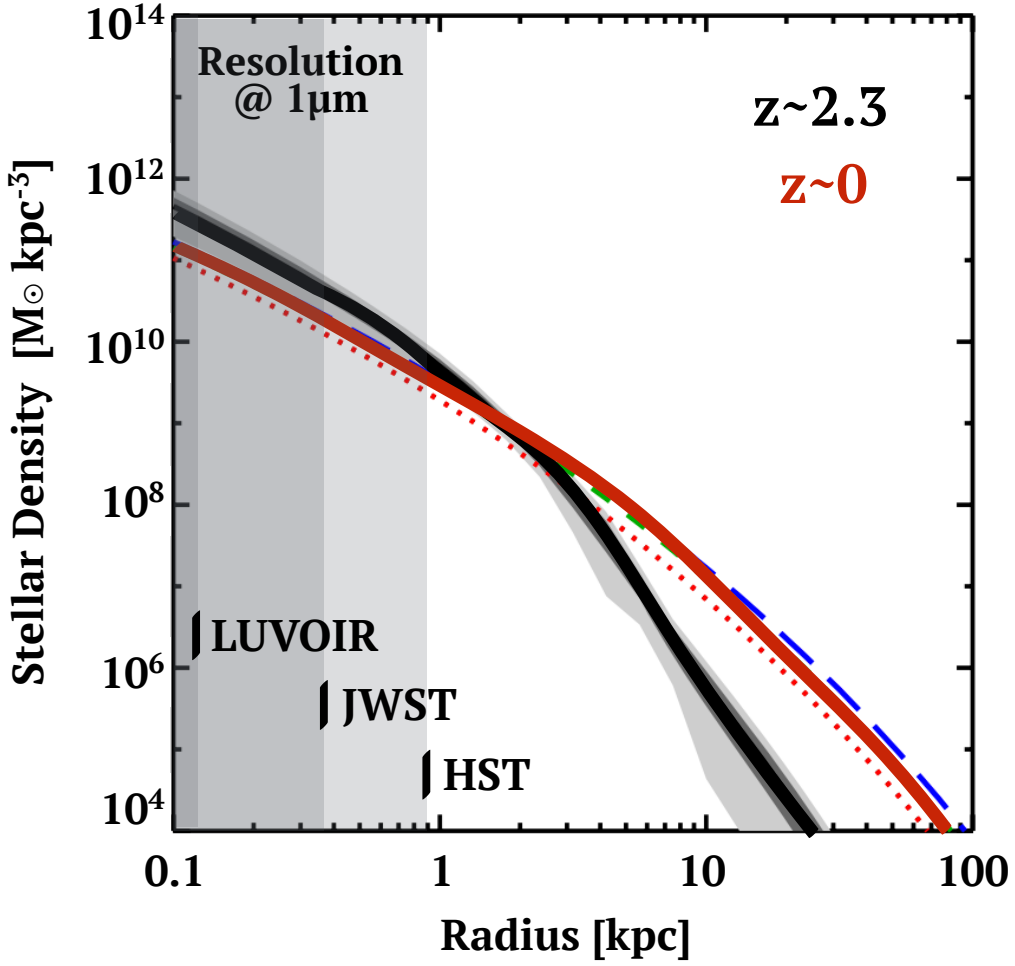
Left: LUVOIR Interim Report, **Right:** Johnson et al. 2017



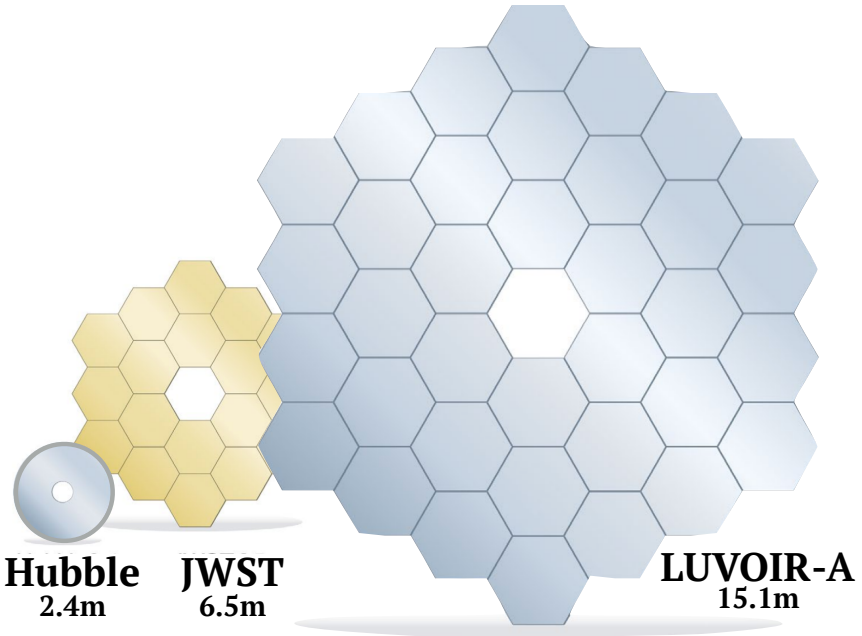


Left: Bezanson et al. 2009, **Right:** NASA/ESA/A.Feild

Left: Bezanson et al. 2009, **Right:** AURA HDST Report



- **Compact Galaxies at z~2 are barely resolved by Hubble.**
- **Resolution of 4-6 meter class space telescopes NOT enough!**



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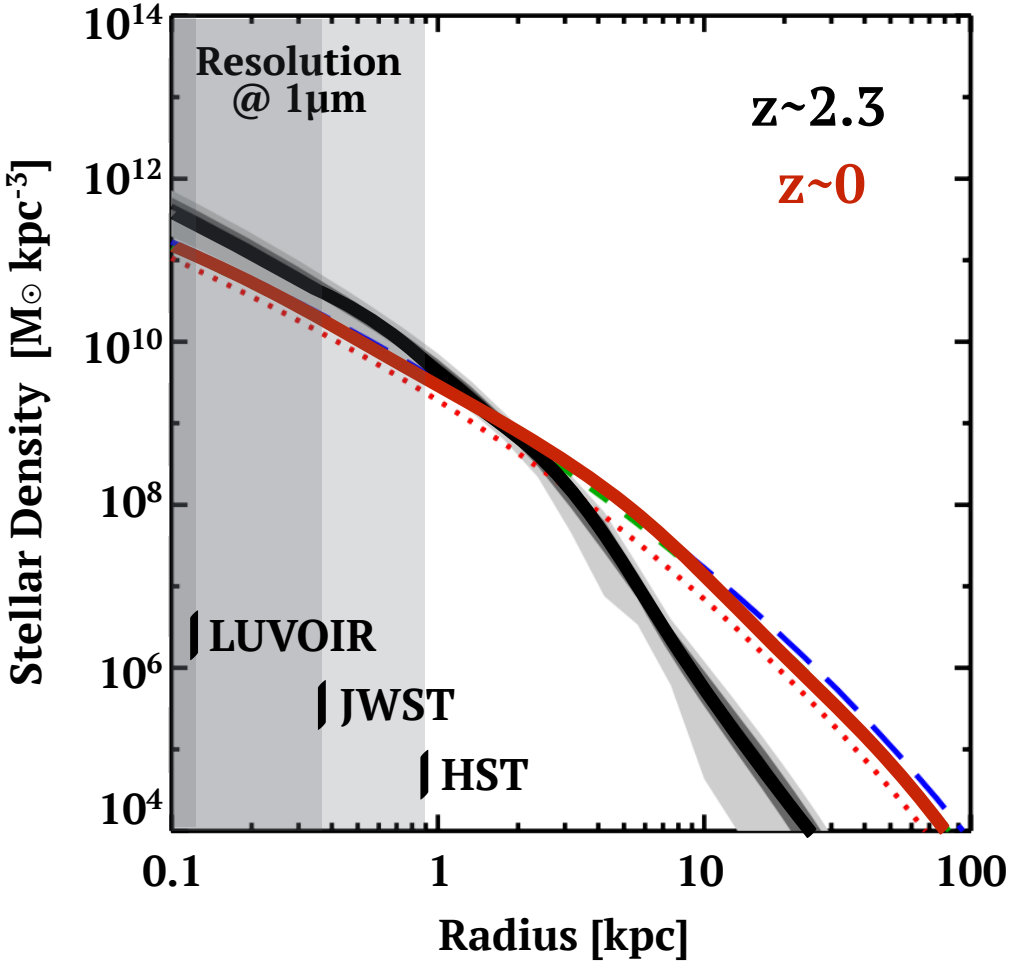

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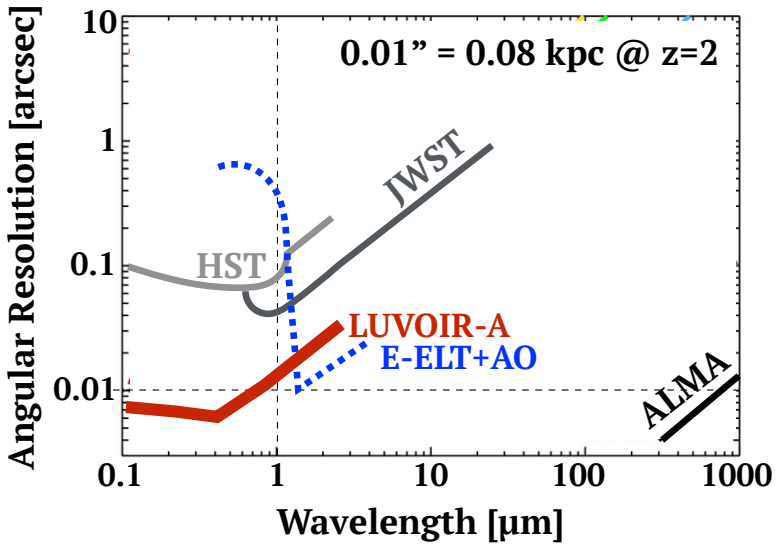
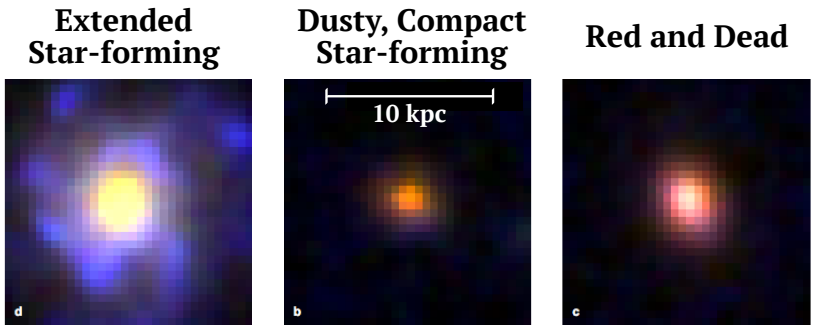
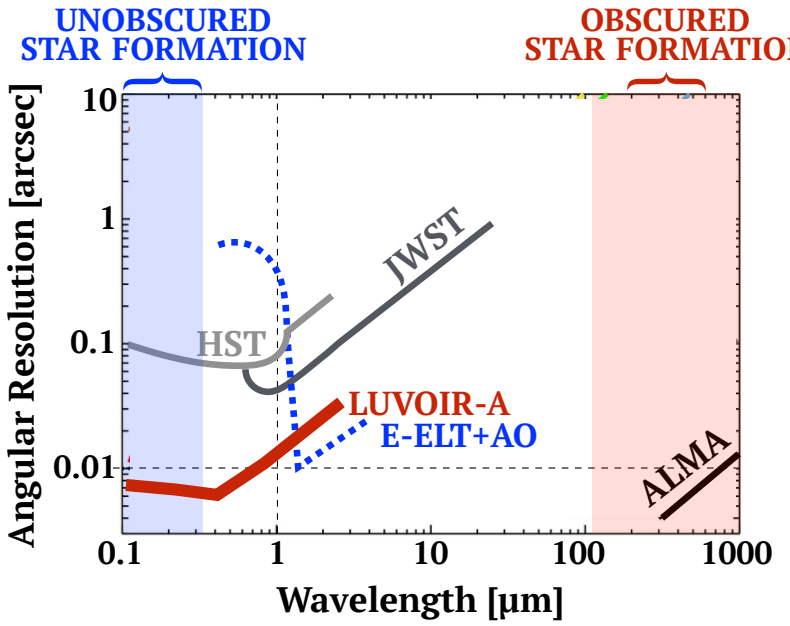


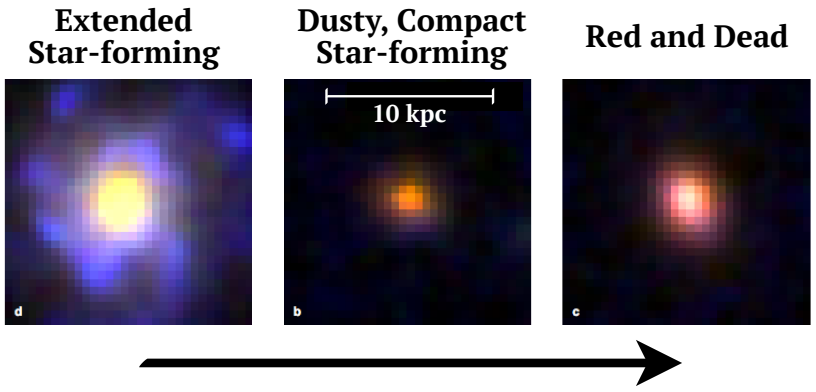


How do galaxies quench?

1. **High Angular Resolution**
2. **Wide Field of View**
3. **UV/Optical Imaging+Spectroscopy**



Top: Nelson et al. 2014, **Bottom:** AURA HDST Report



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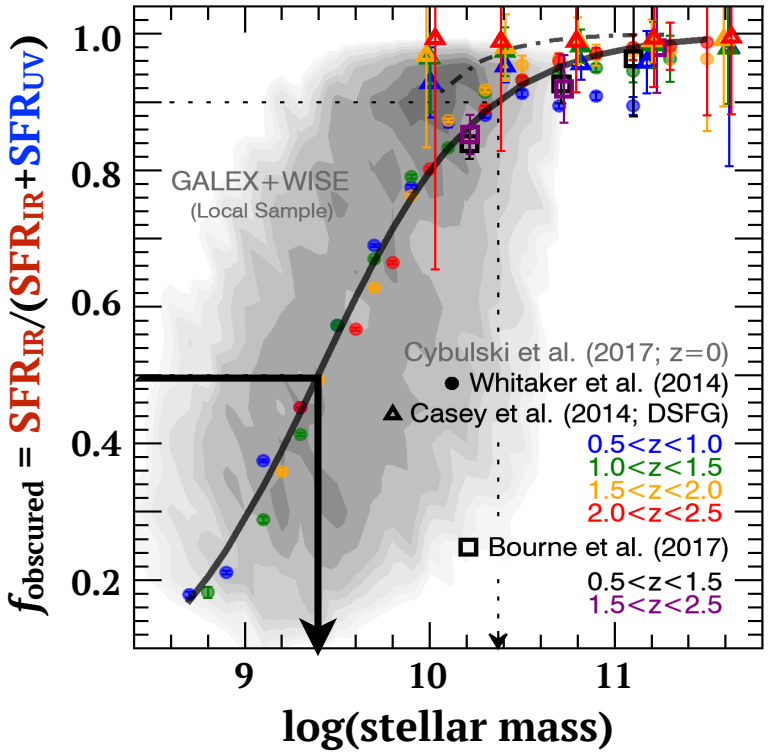
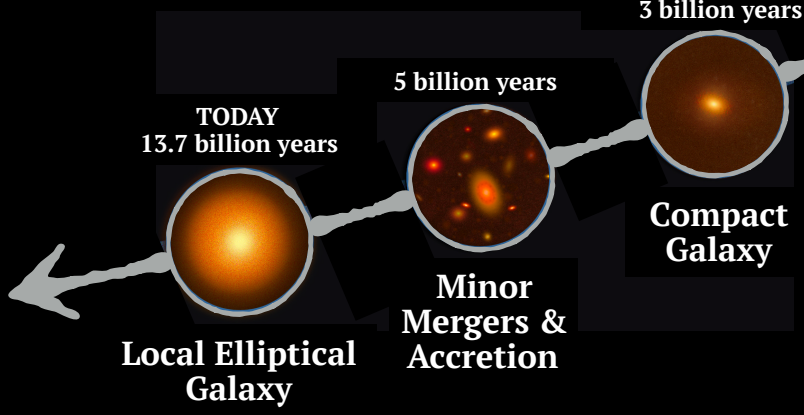


Top: Nelson et al. 2014, **Right:** Whitaker et al. 2017

Key observational signatures will be captured in spatially-resolved age, dust, SFR, and metallicity.



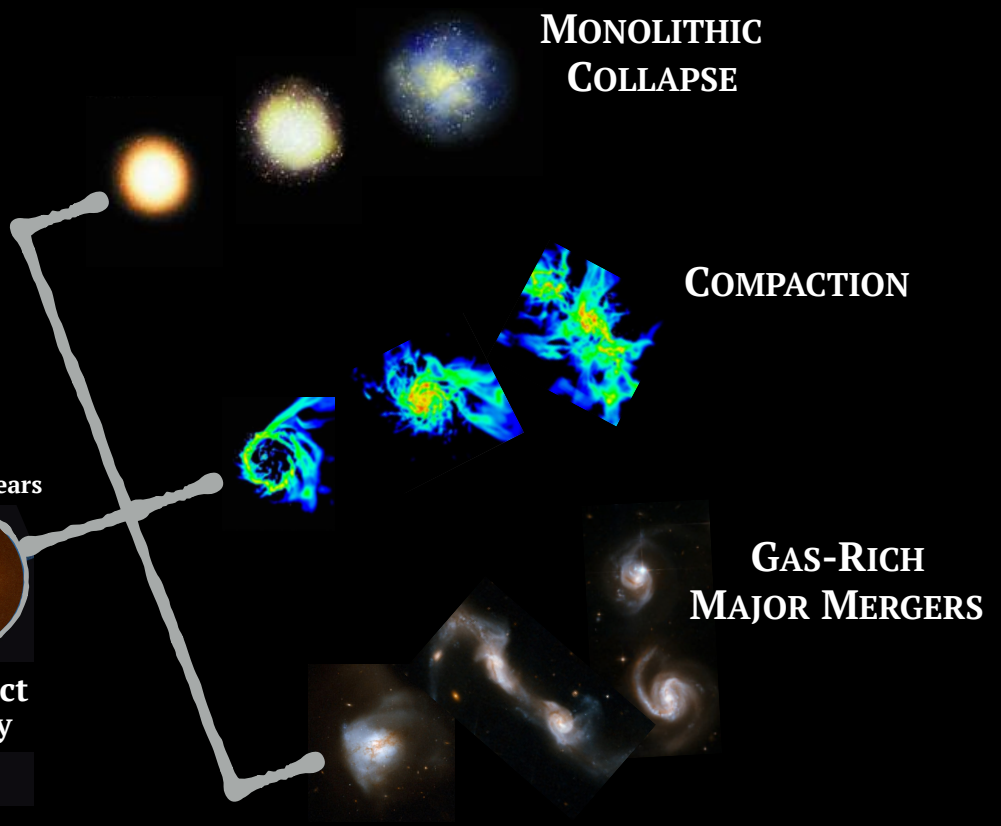


Image Credit: (Top) **Pearson Education,** (Middle) **Zolotov et al. 2014,** (Bottom) **NASA/ESA/Hubble Heritage Team,** (Left) **NASA/ESA/S.Toft/A.Feild**

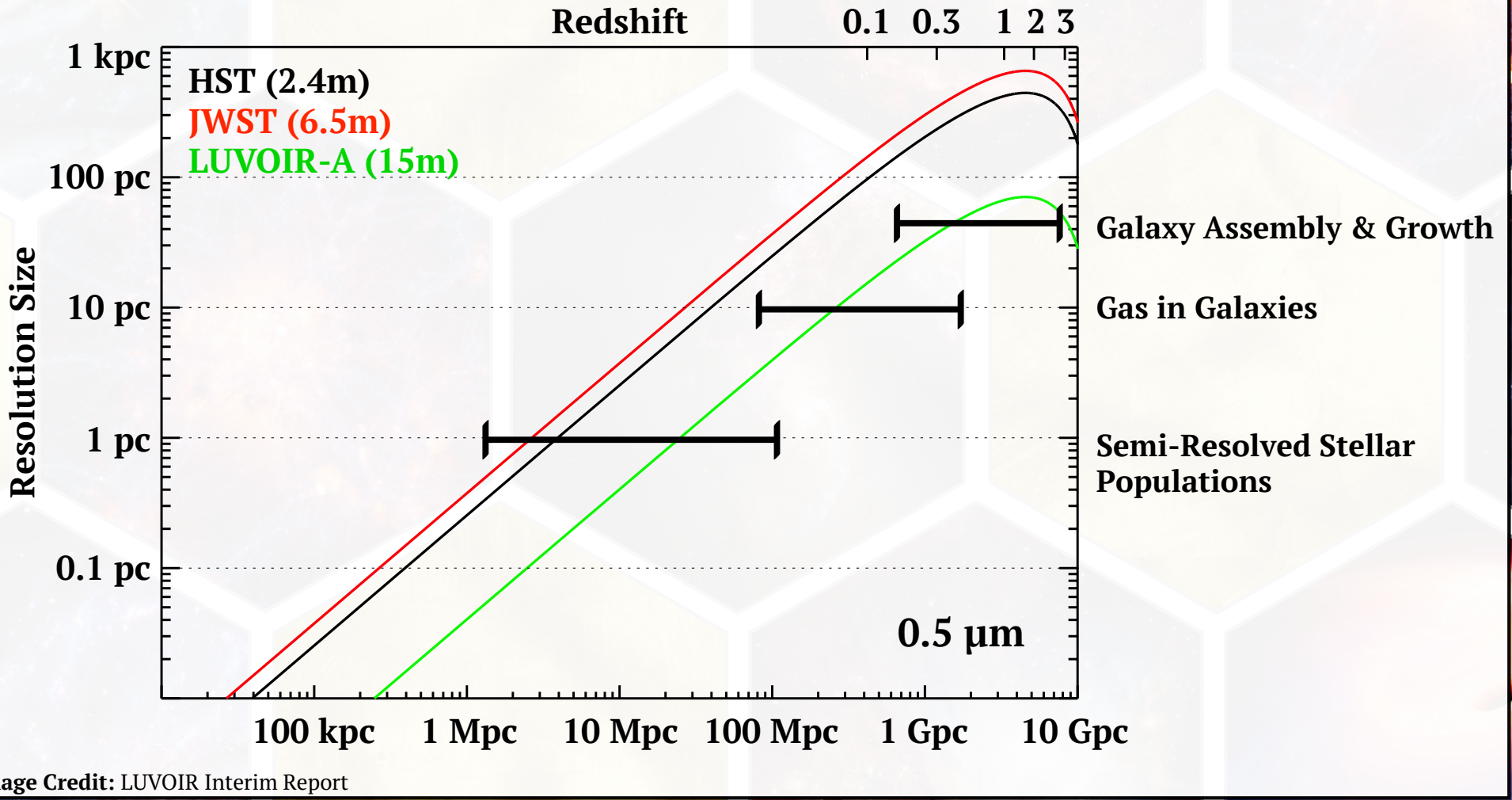


Image Credit: LUVOIR Interim Report

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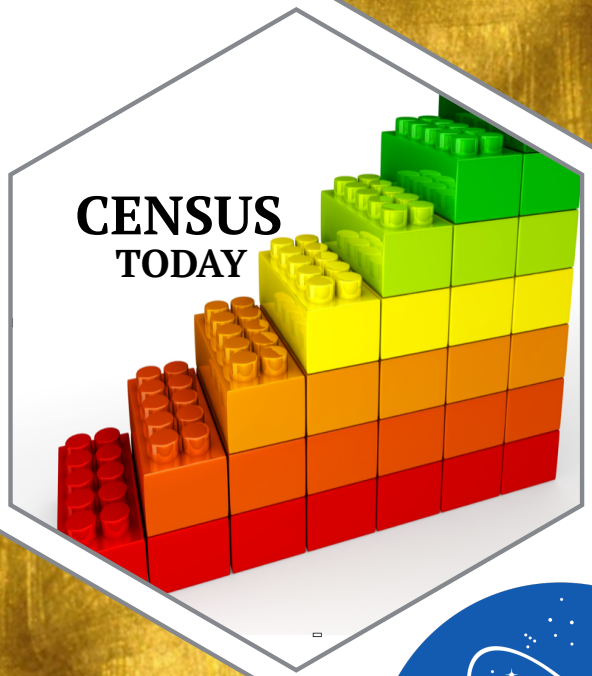
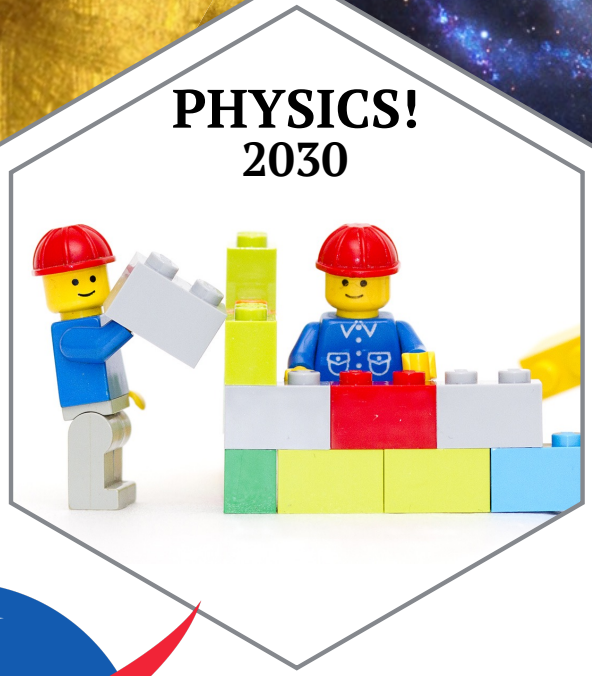
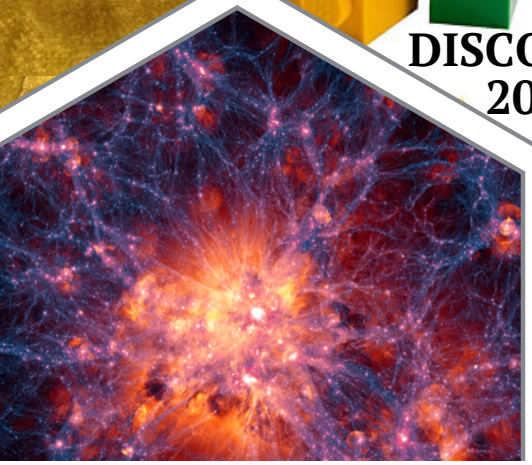
DISCOVERY
2000



CENSUS
TODAY



PHYSICS!
2030



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