The background of the slide is a detailed cosmological simulation. It shows a vast network of blue, filamentary structures representing dark matter, with numerous bright orange and yellow galaxies scattered throughout. Overlaid on this are several concentric circles and arcs, some of which are marked with numerical values like 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, and 260, suggesting a coordinate system or a specific simulation parameter.

PREDICTING COLOR-COLOR OBSERVATIONS FOR JWST USING LARGE-SCALE COSMOLOGICAL SIMULATIONS

STUDENT: CLARA LILJE

SUPERVISOR: DR. MÉLANIE HABOUZIT

IDEA AND METHOD



Simulate observations of galaxies and black holes in JWST filters

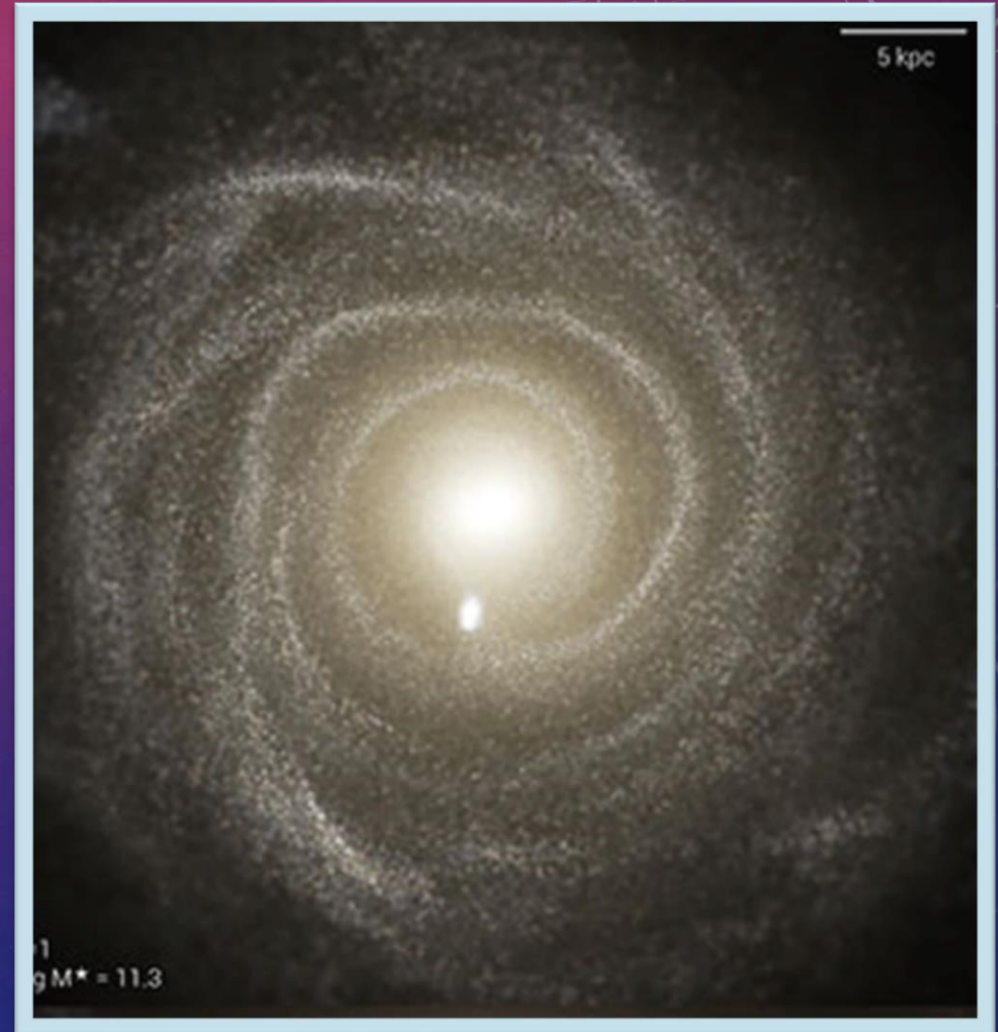


Extract information from TNG simulation



Simulate galaxy and black hole spectral energy distributions (SED)

Extract magnitudes in JWST filter bands



IDEA AND METHOD



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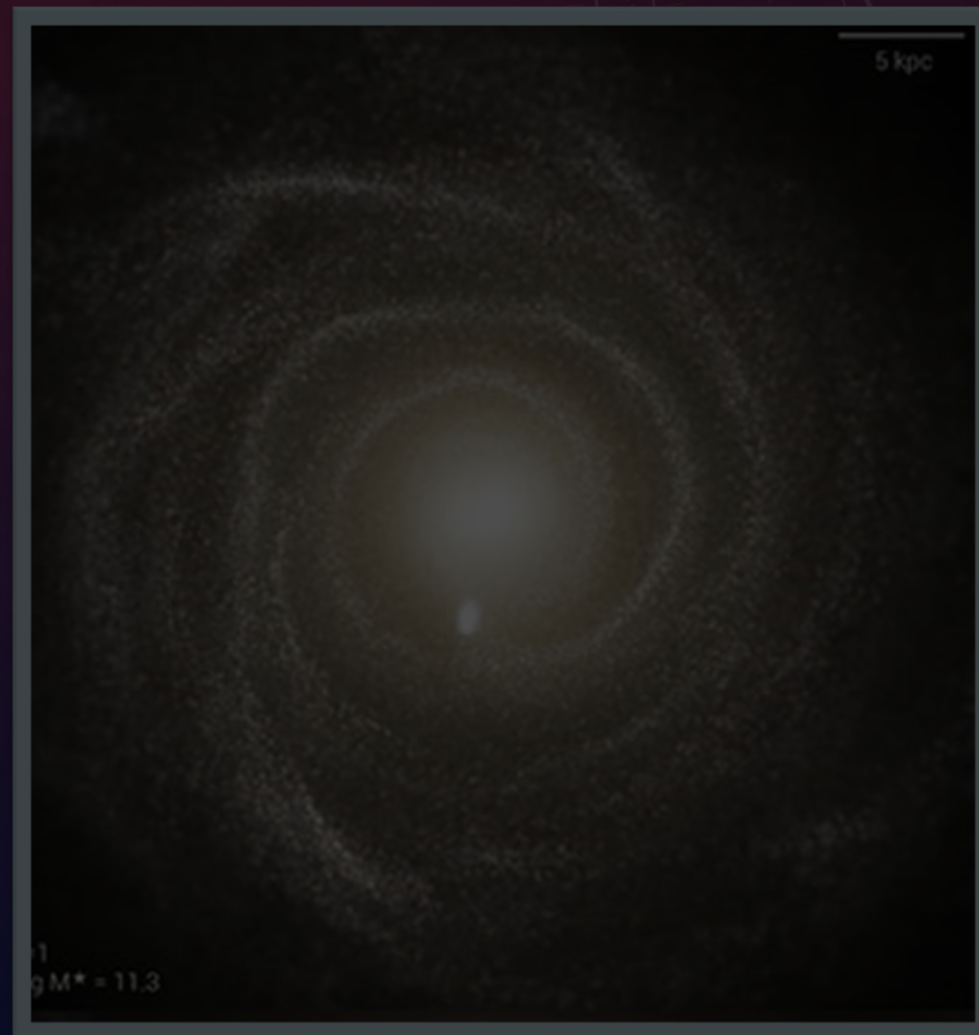


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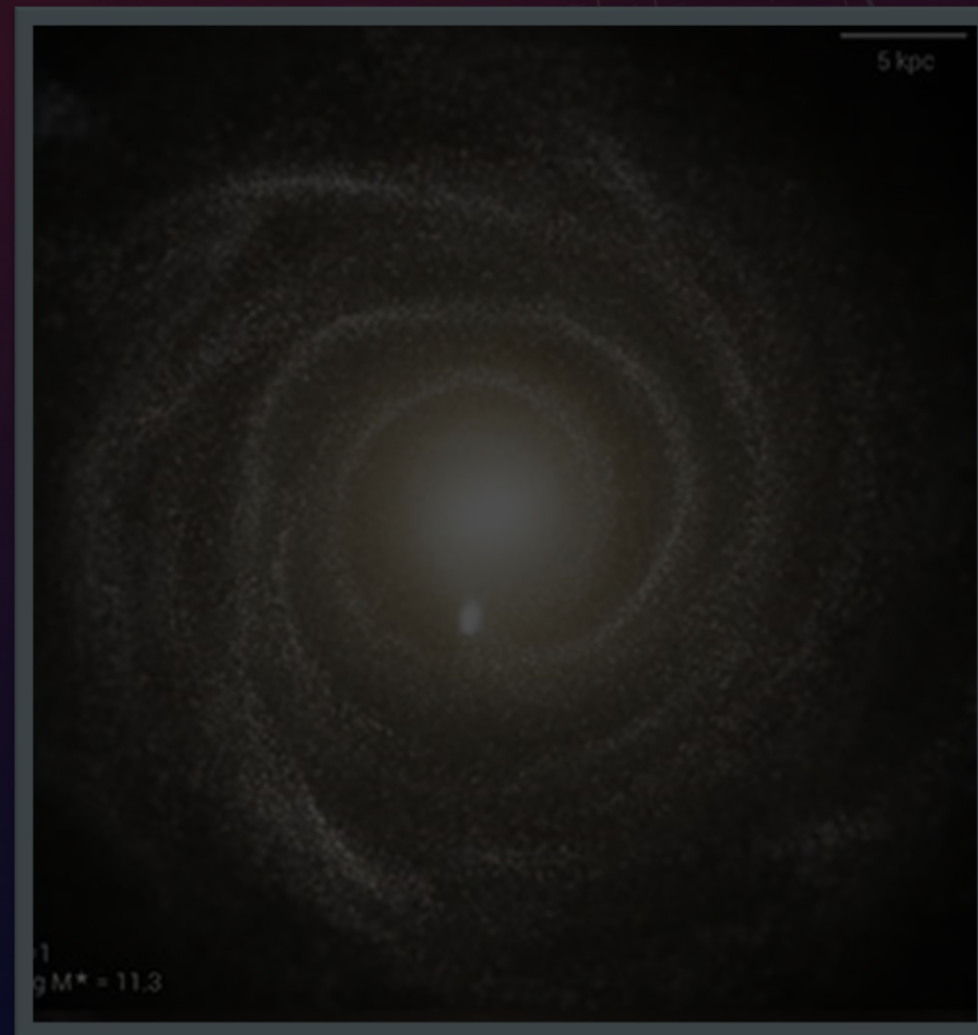


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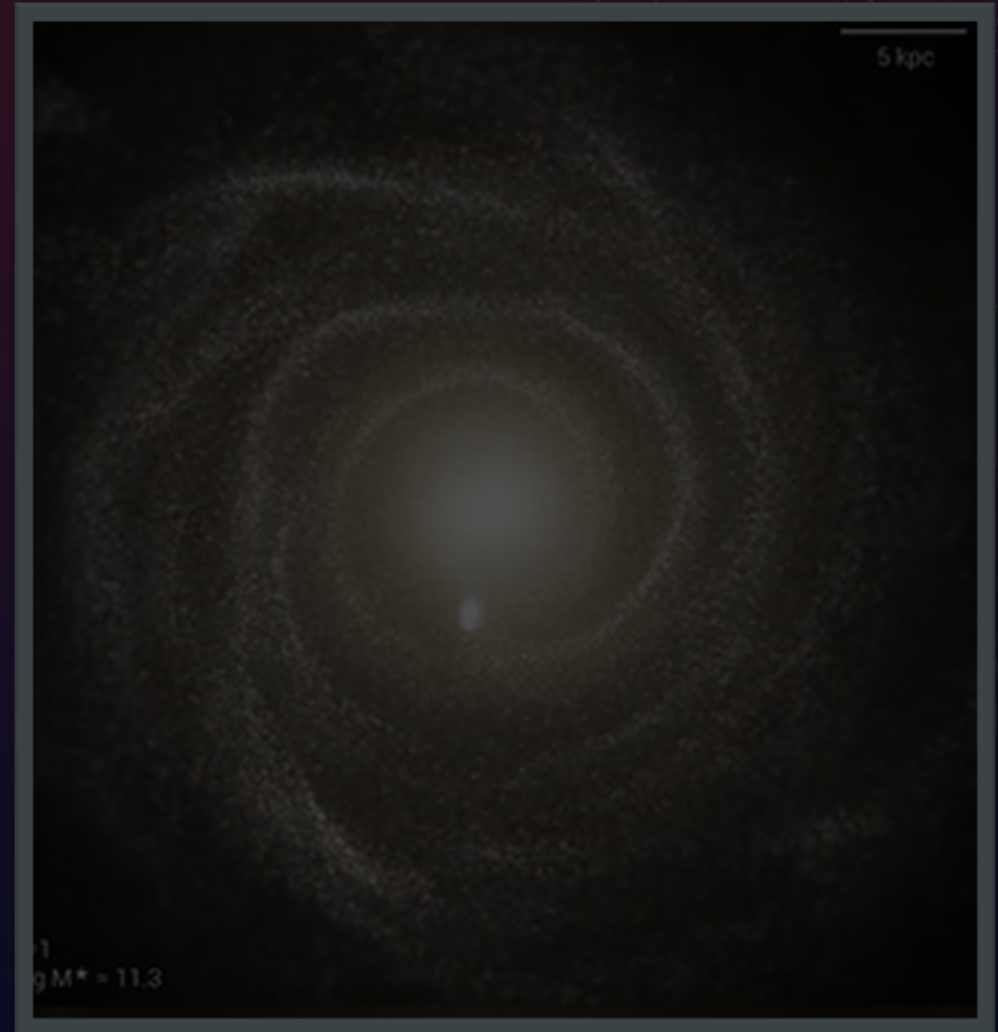


Extract information from TNG simulation

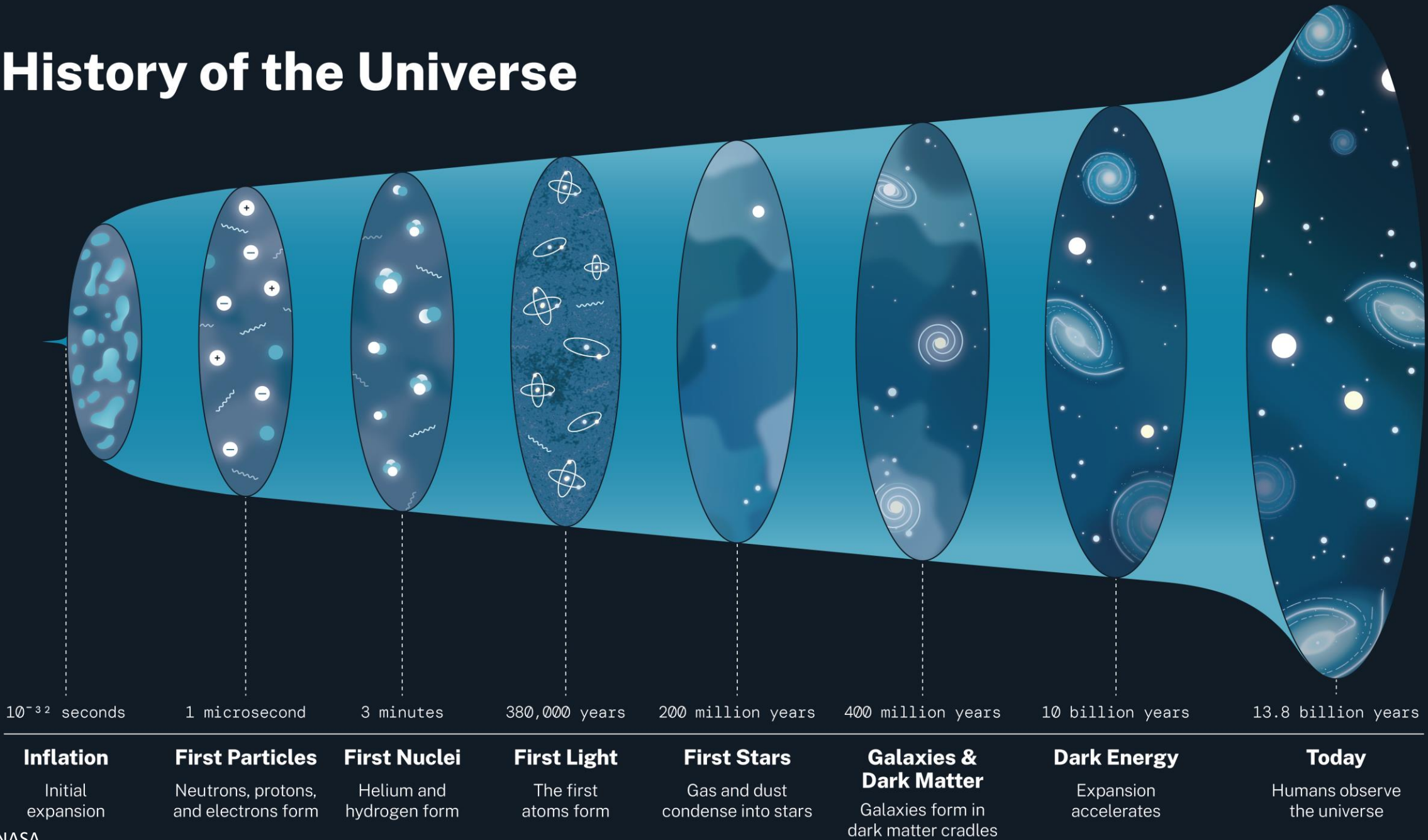


Simulate galaxy and black hole spectral energy distributions (SED)

Extract magnitudes in JWST filter bands

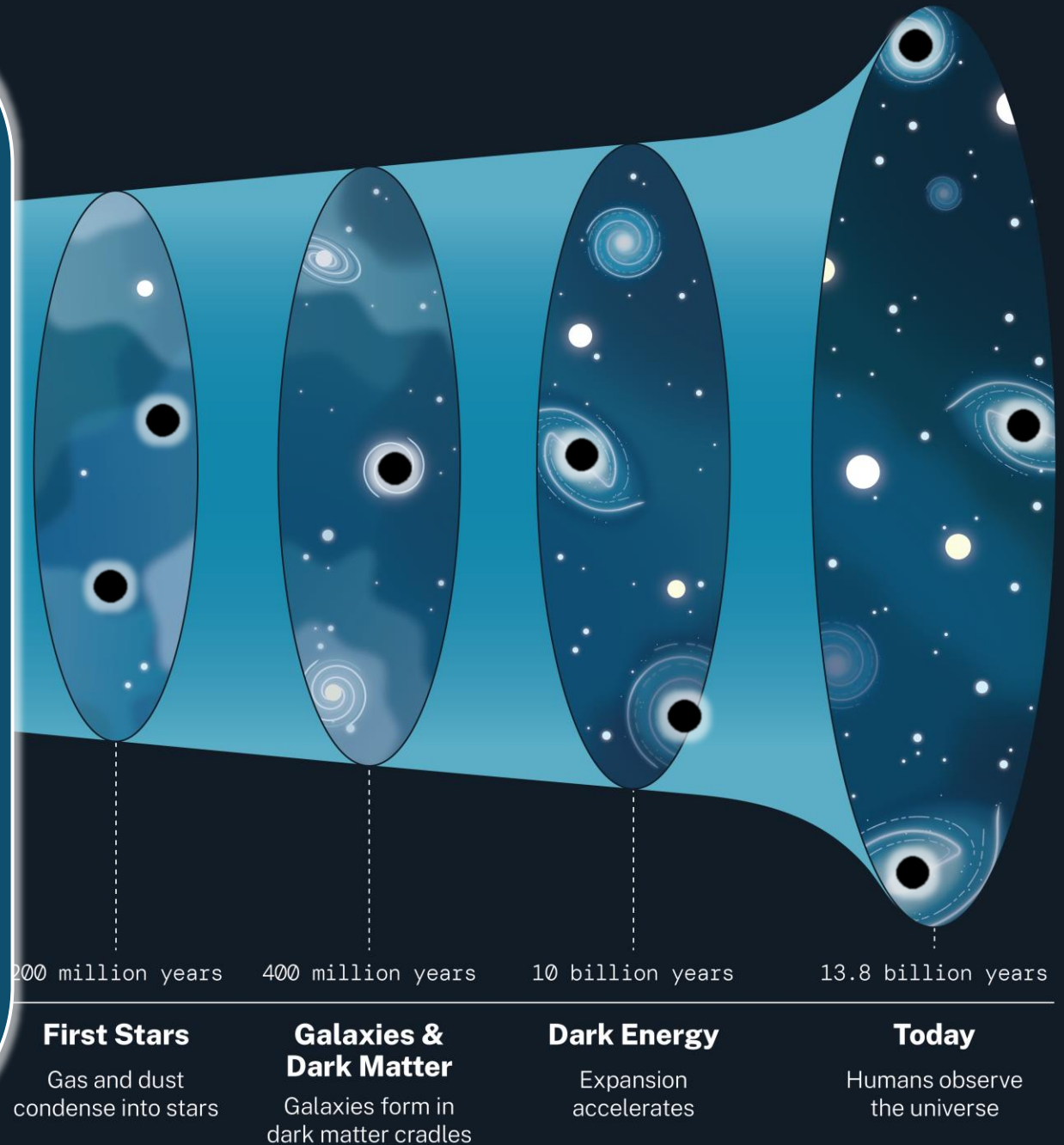


History of the Universe

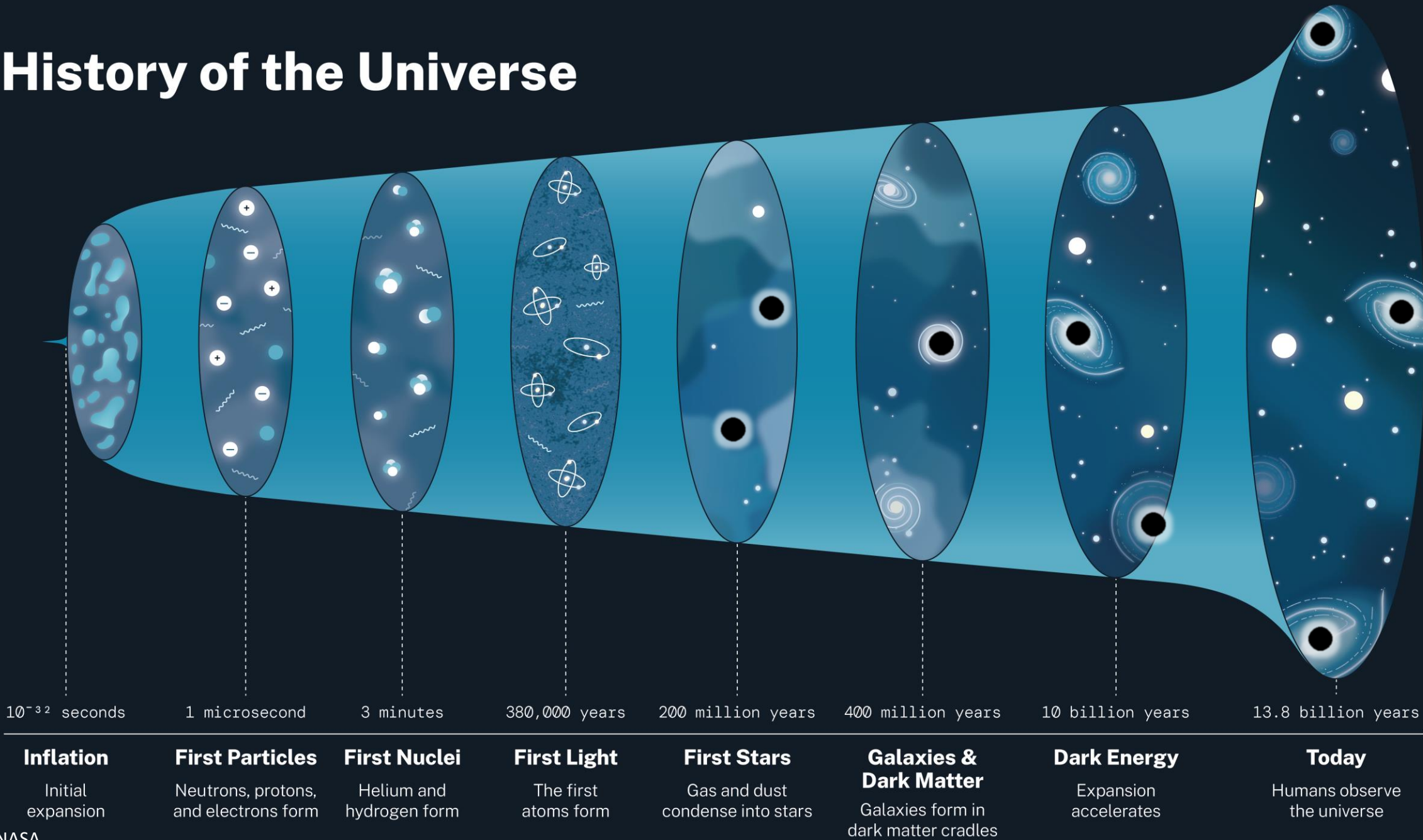


MASSIVE BLACK HOLES (MBH)

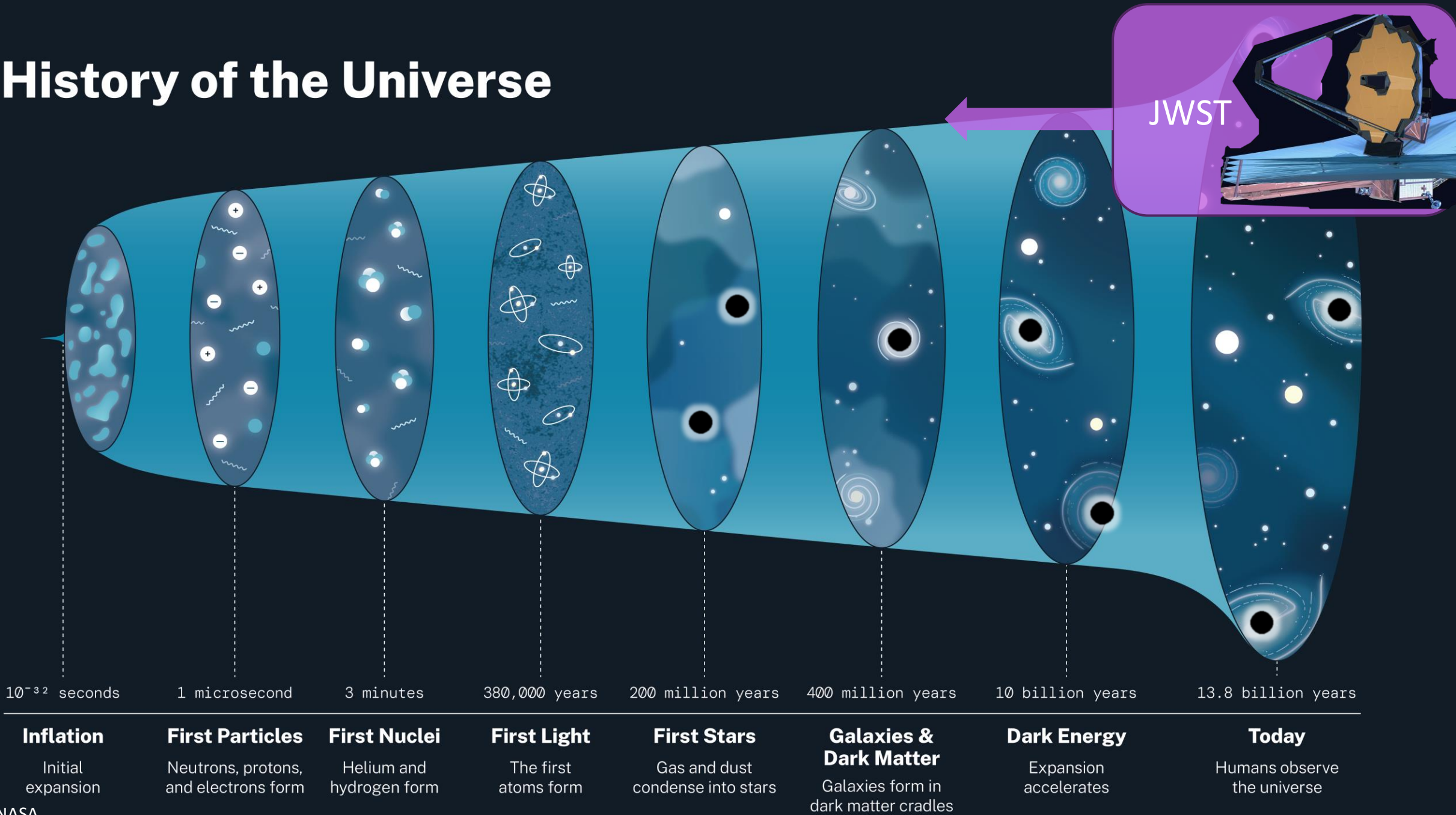
- Located at **Galactic Center**
- **Interaction** with surrounding gas and stars
- AGN: Large **Emission**



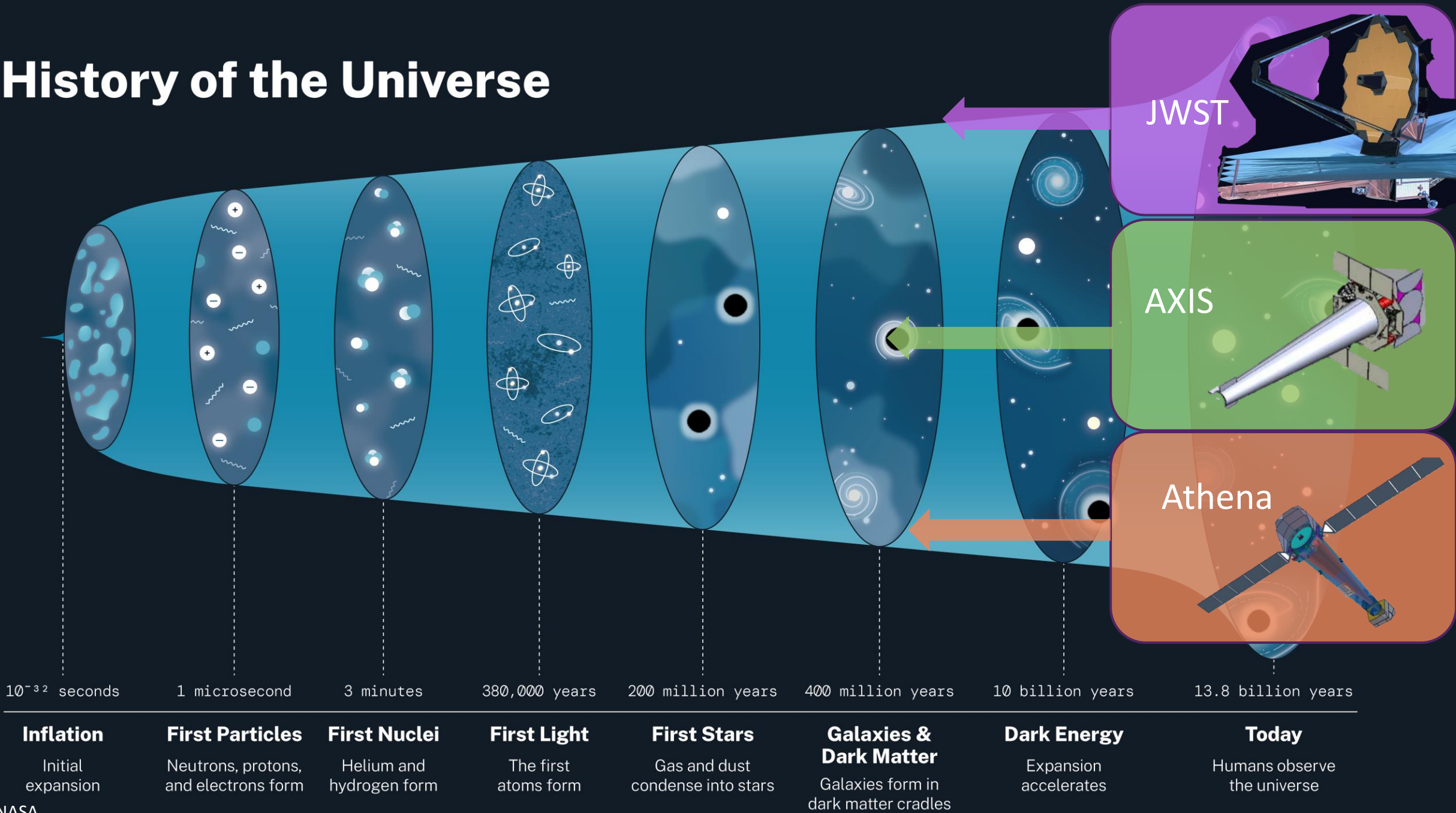
History of the Universe



History of the Universe



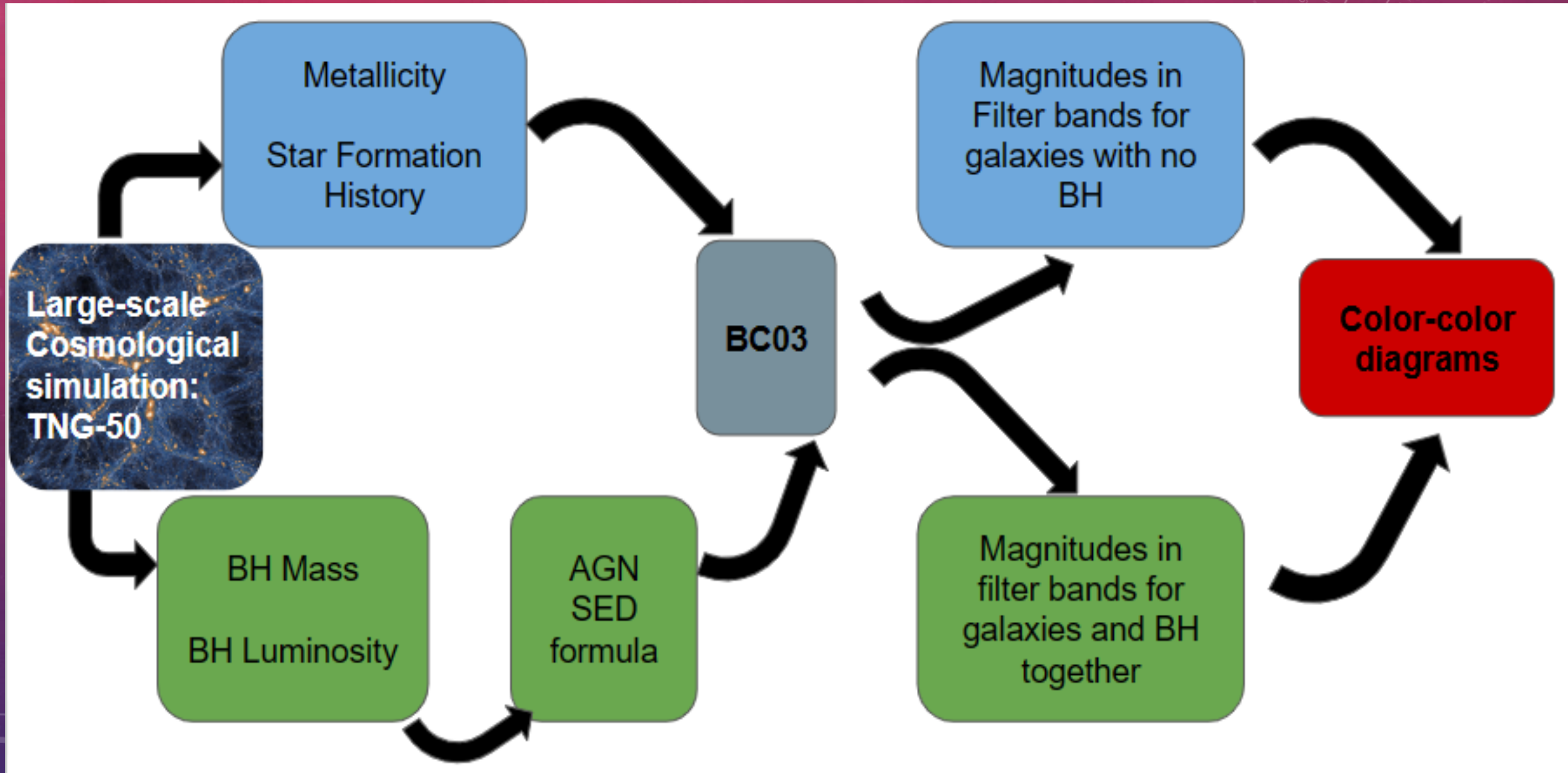
History of the Universe

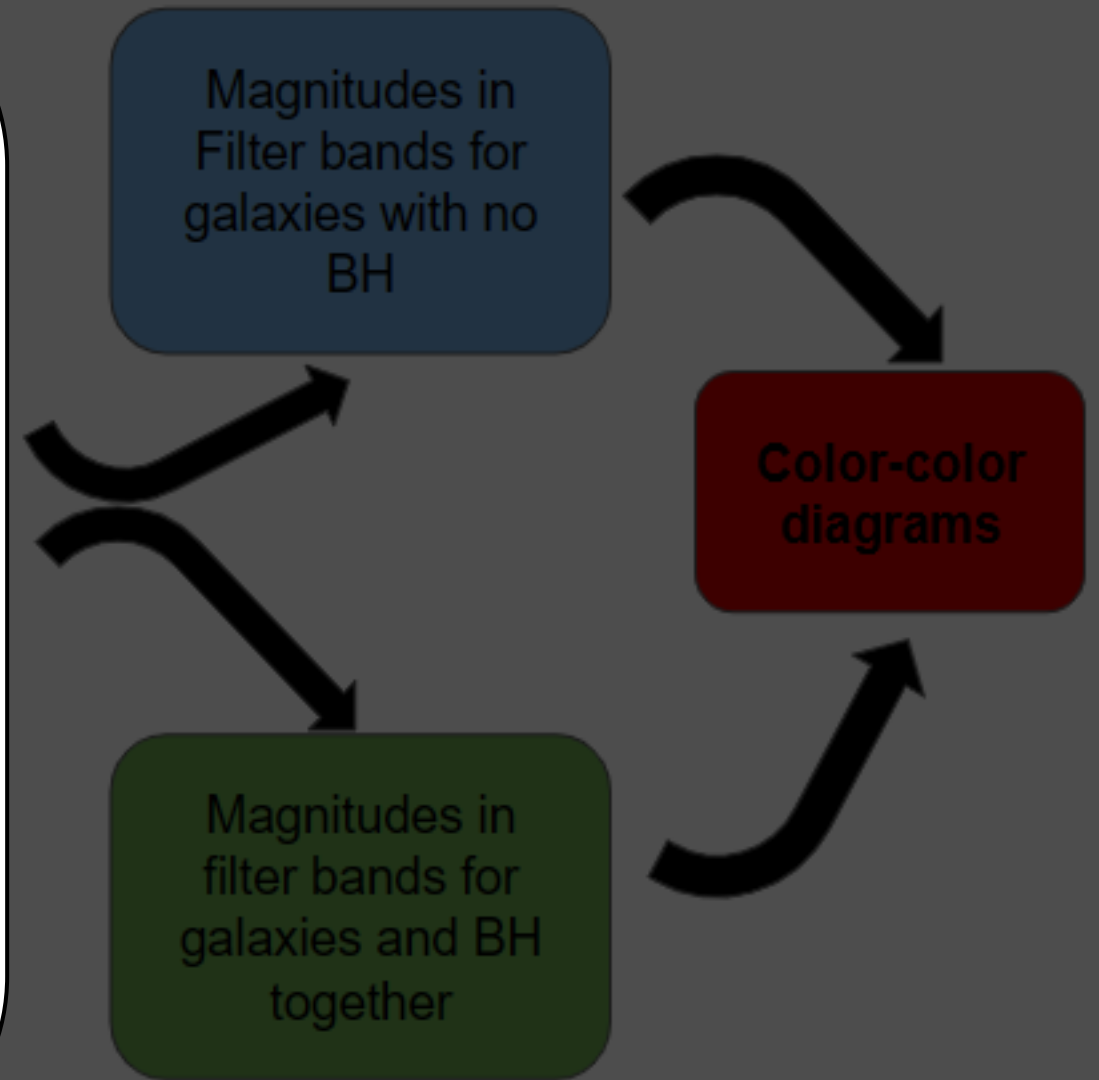
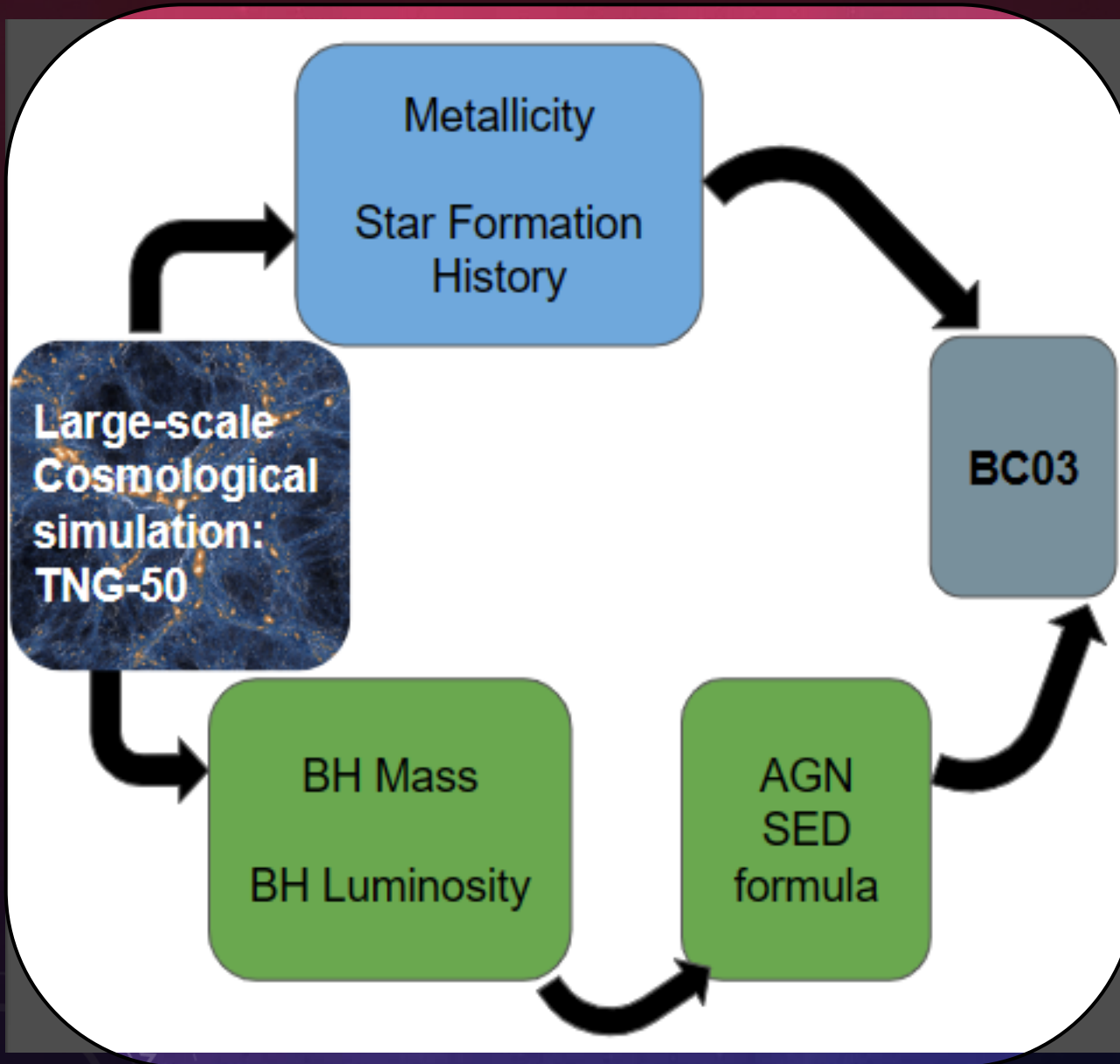


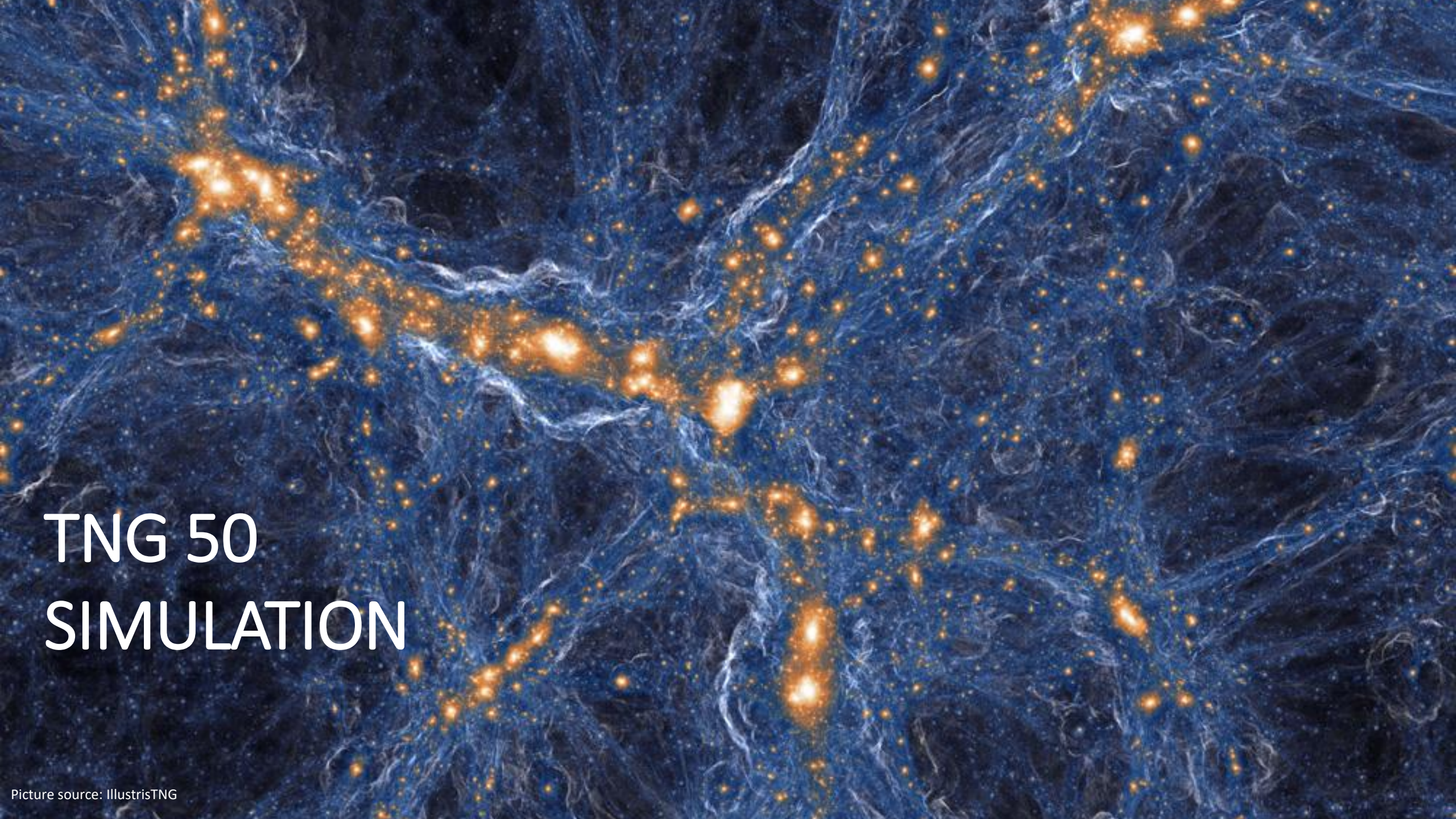
JWST

AXIS

Athena

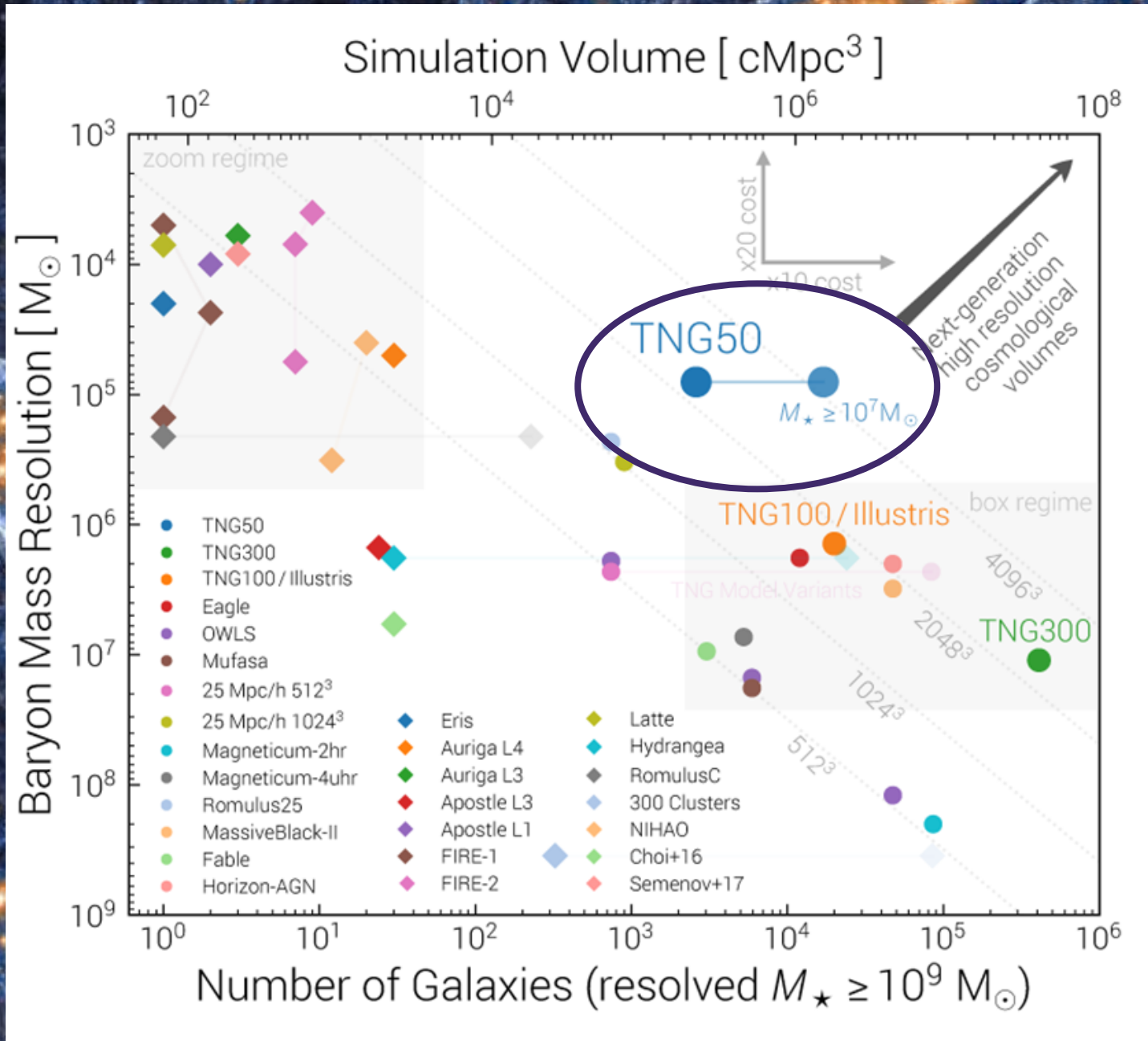




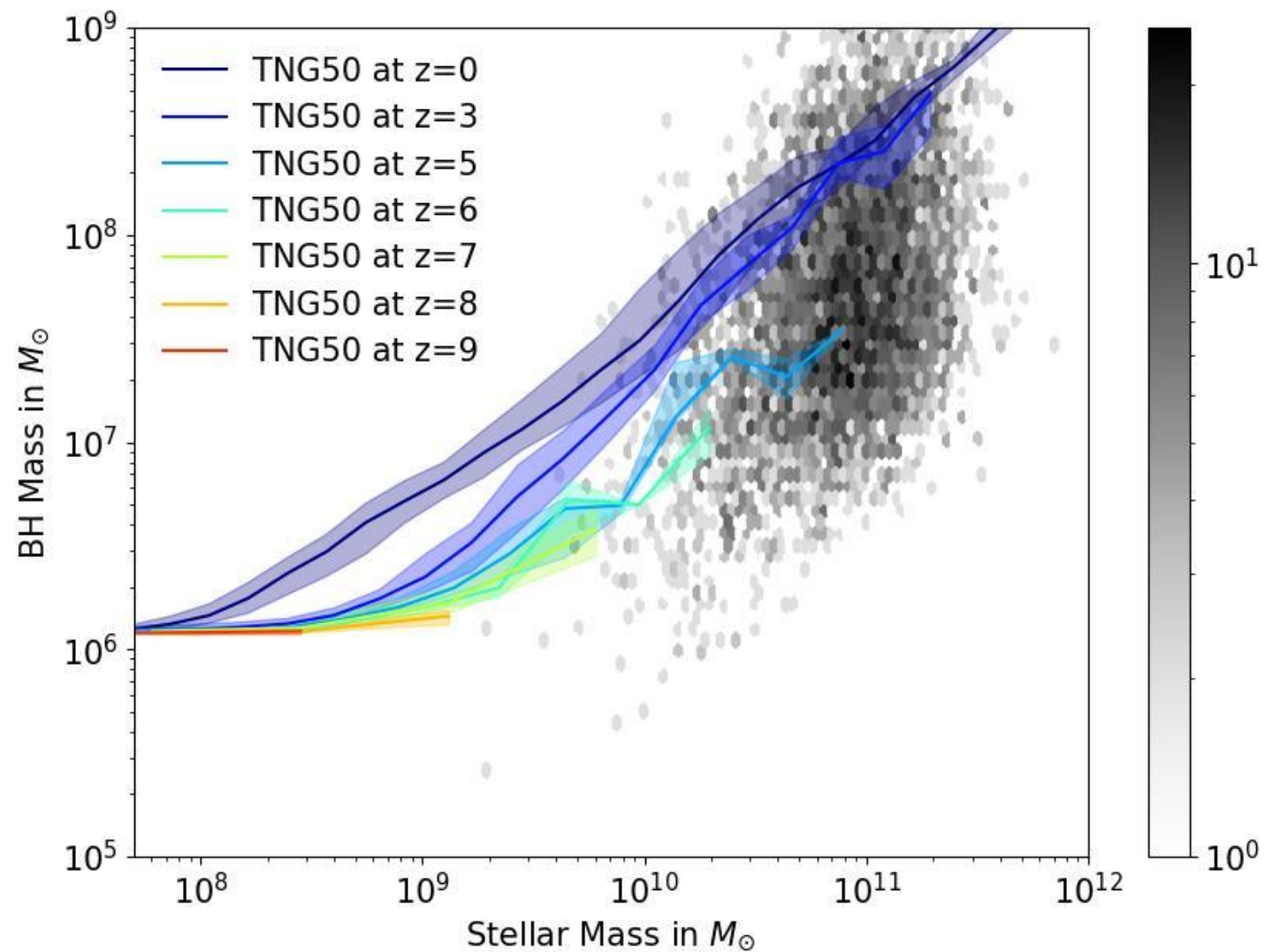


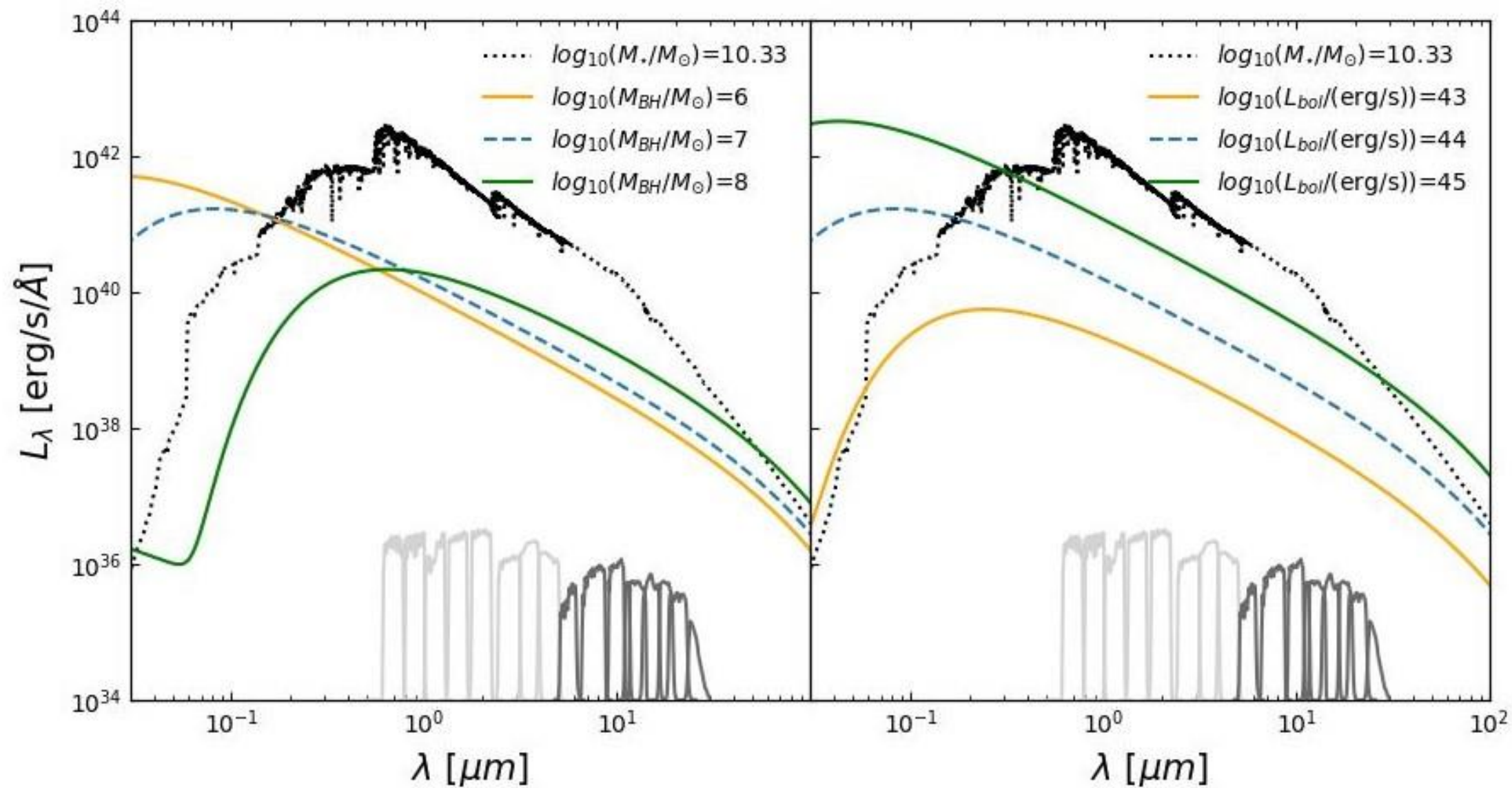
TNG 50 SIMULATION

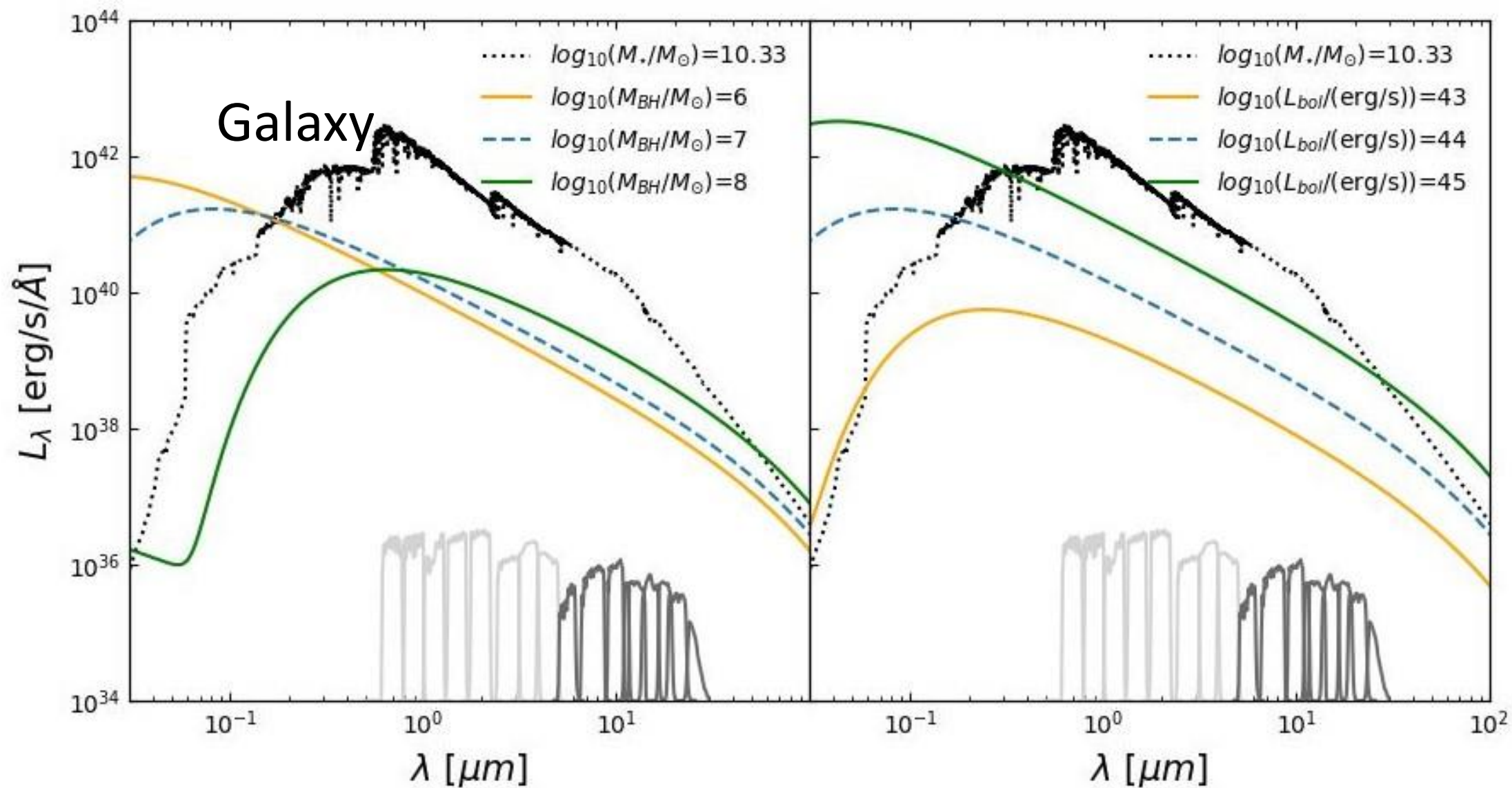
TNG 50 SIMULATION

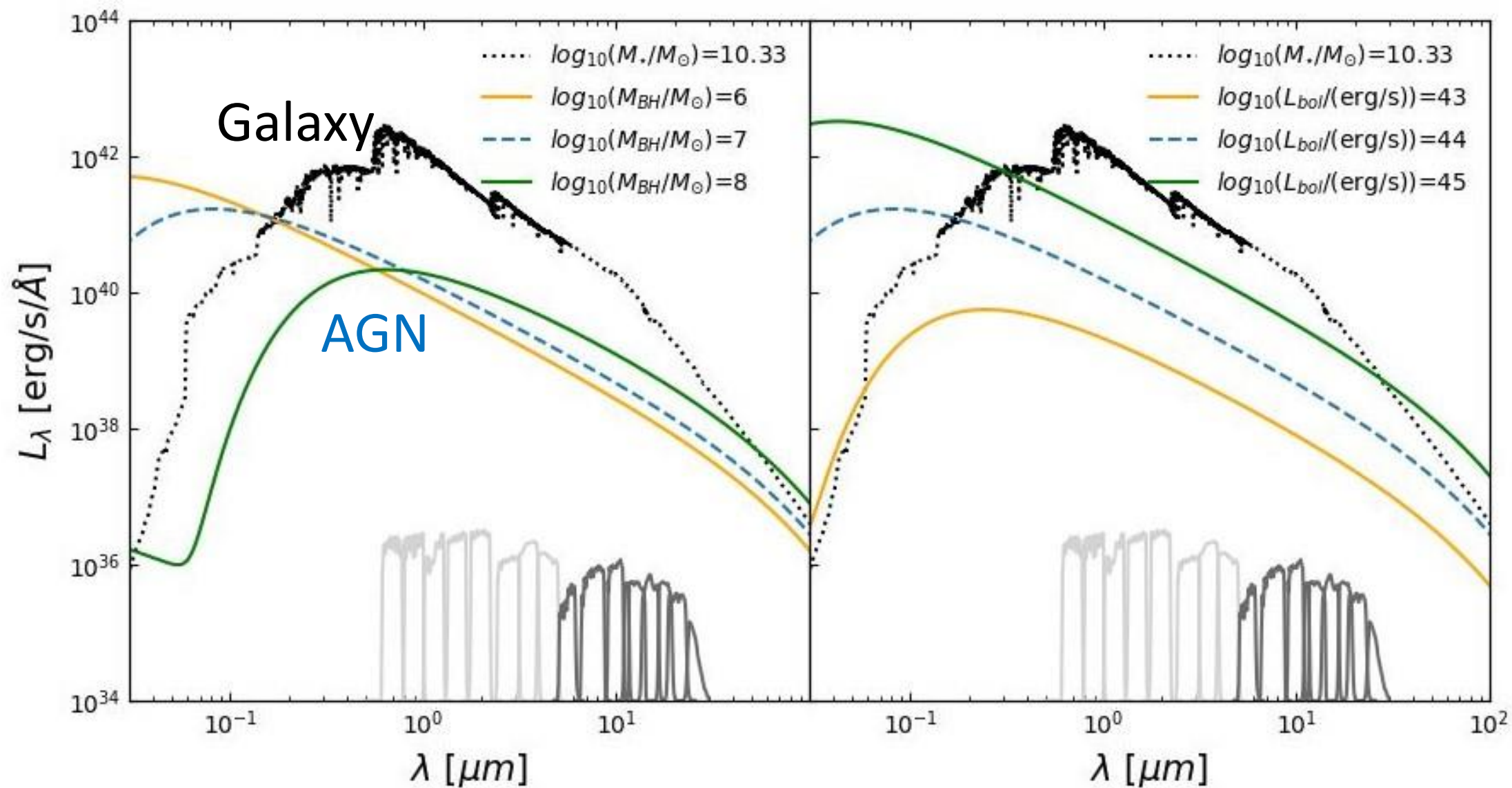


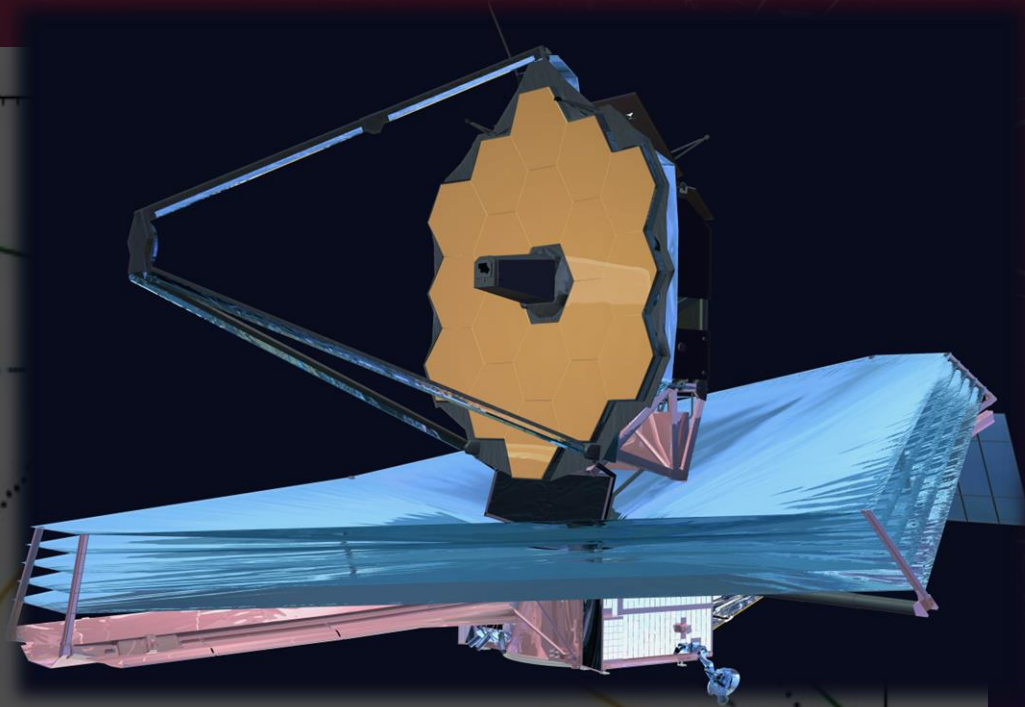
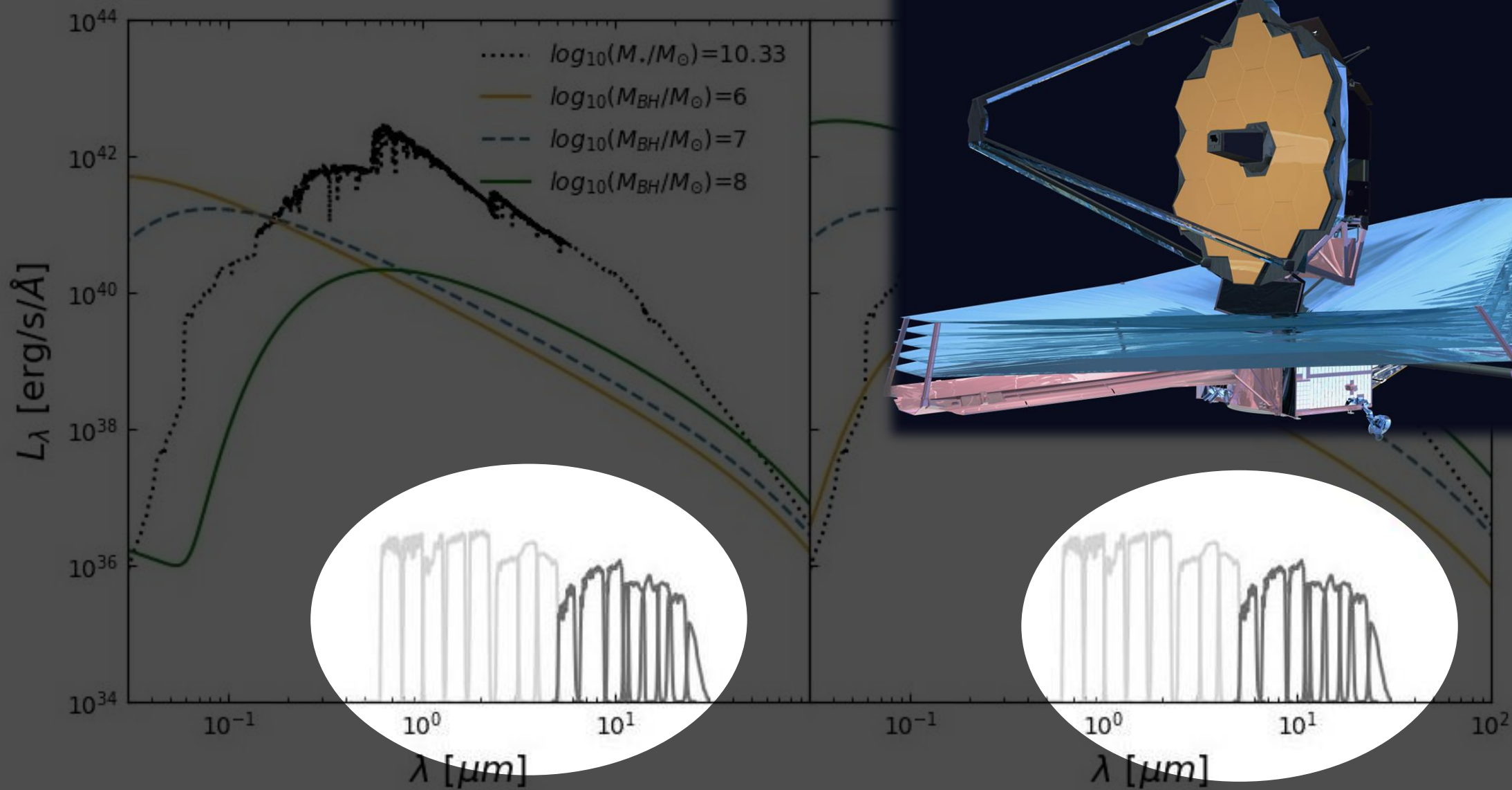
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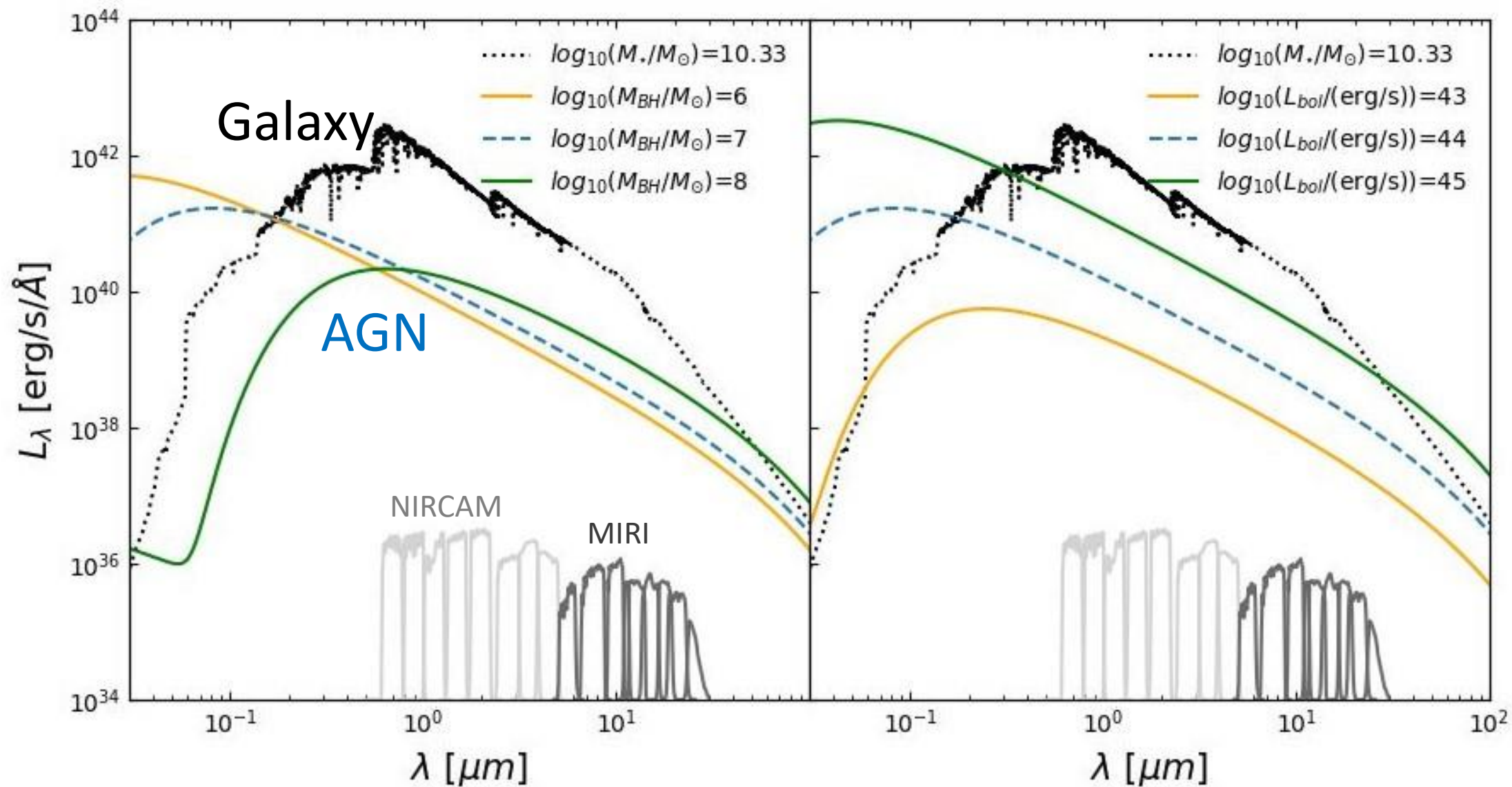


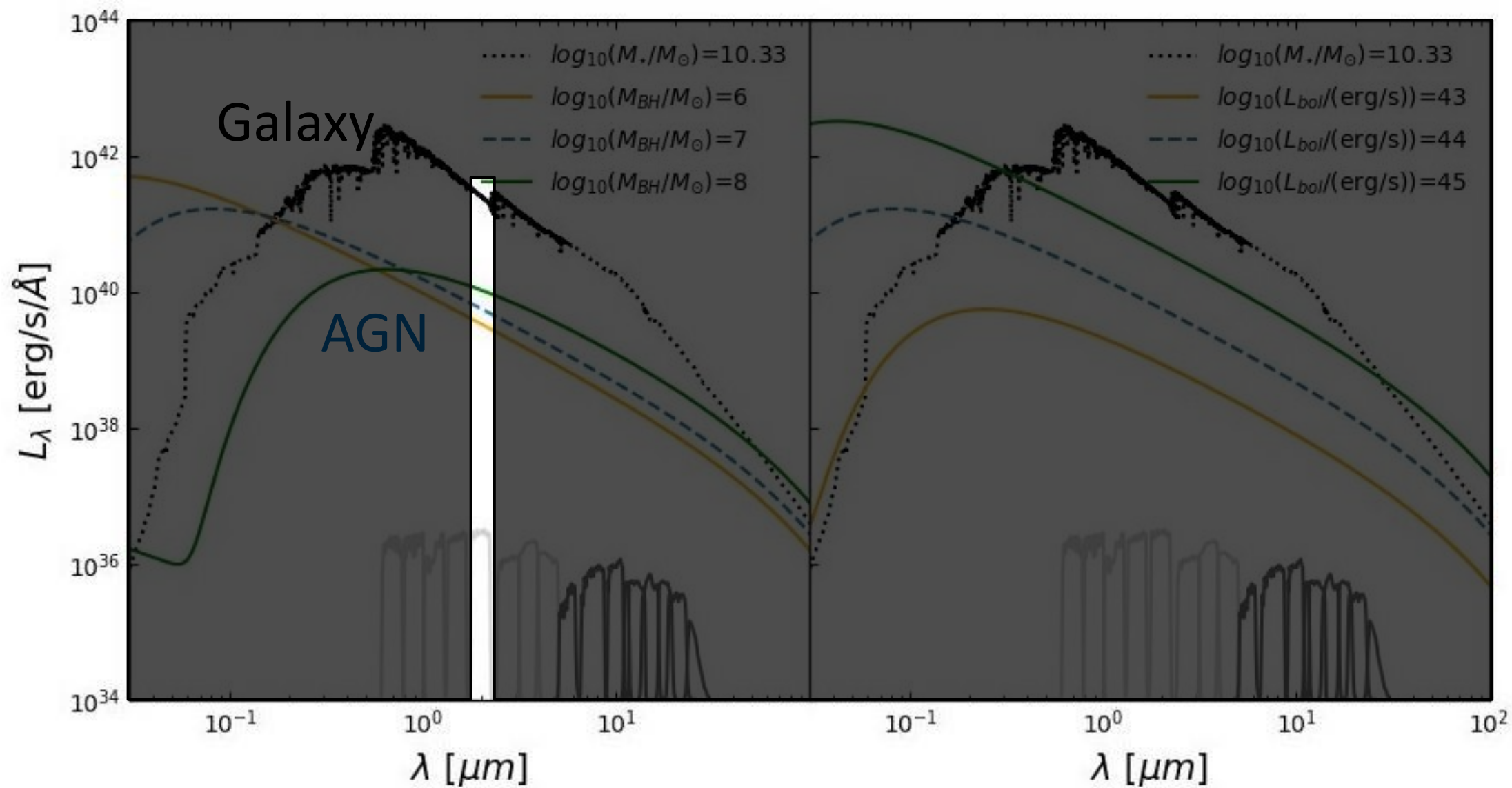


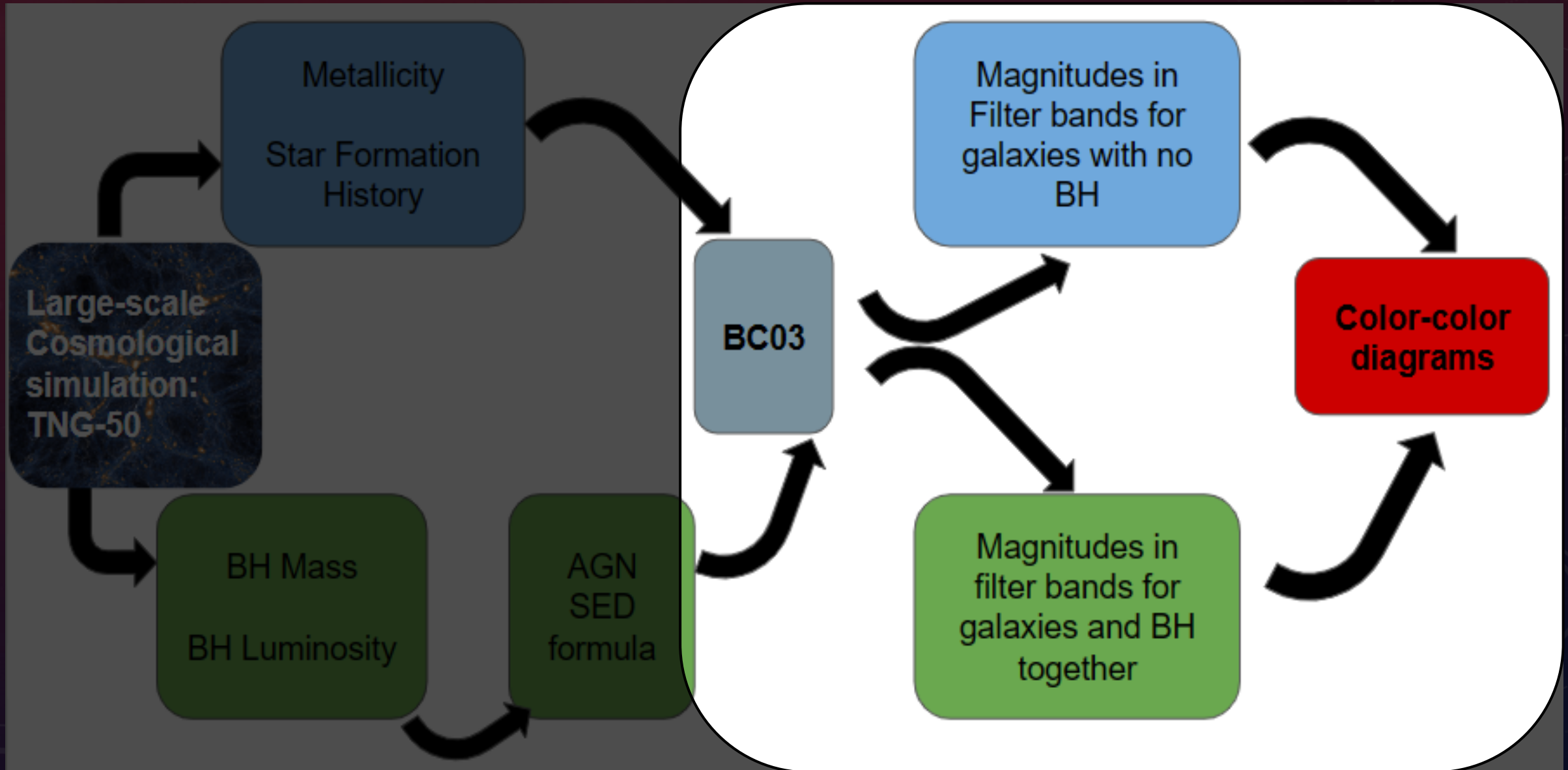


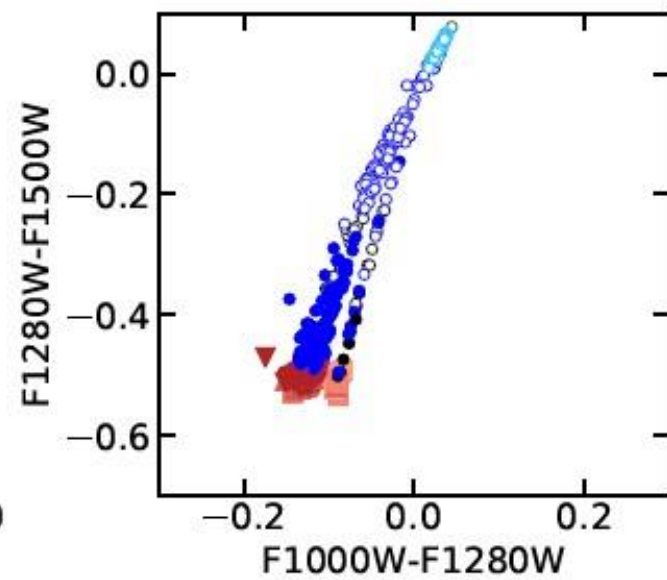
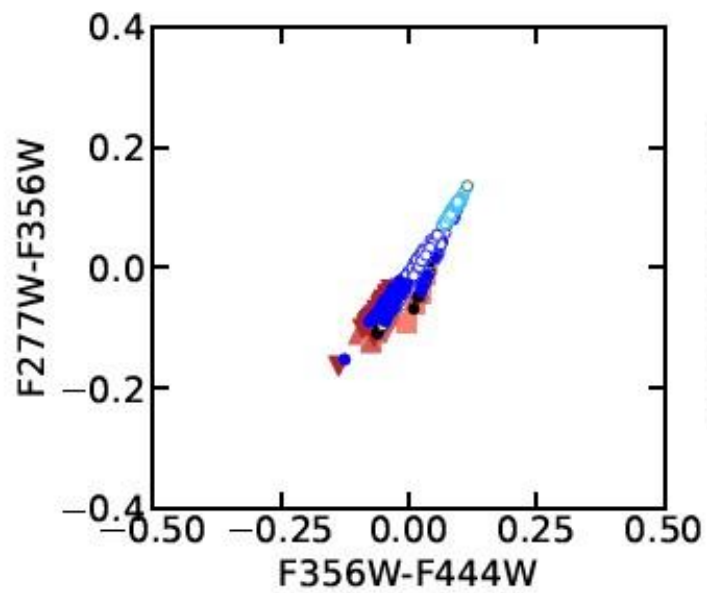
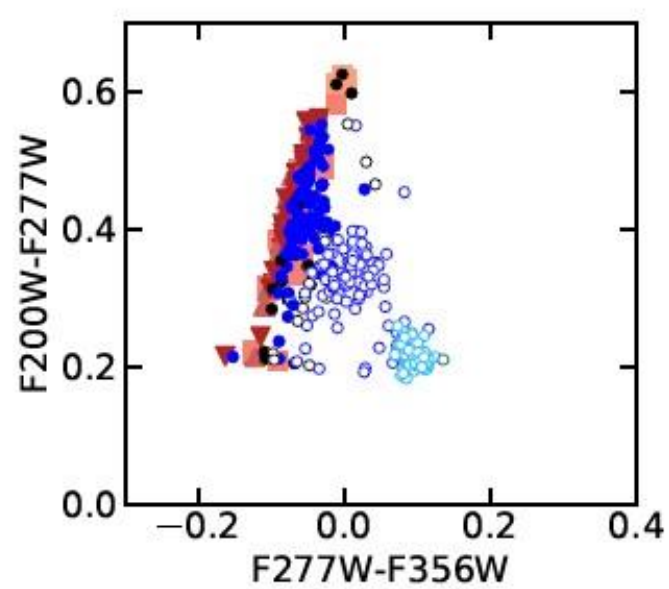
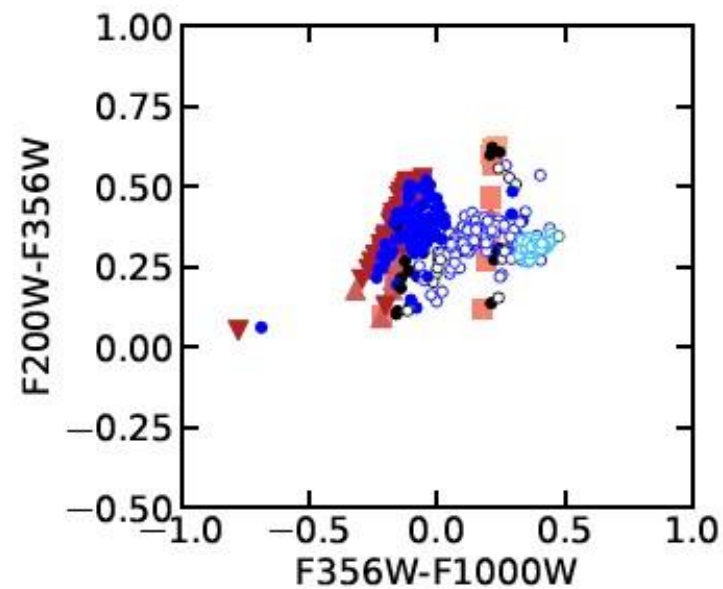
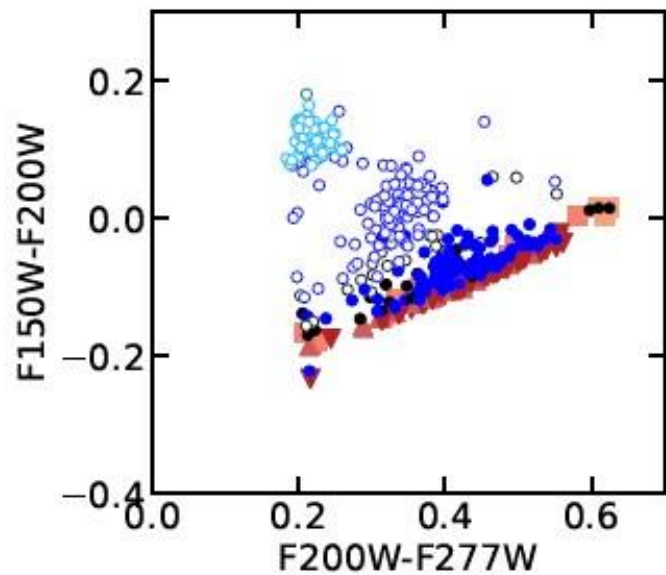
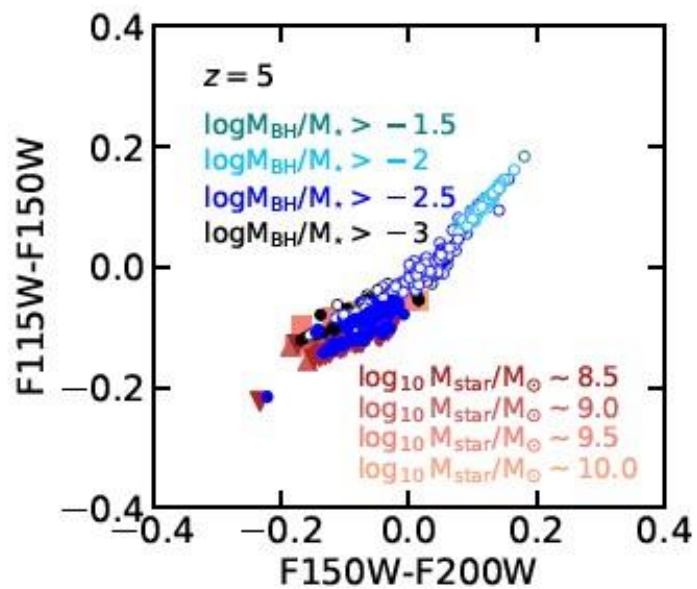


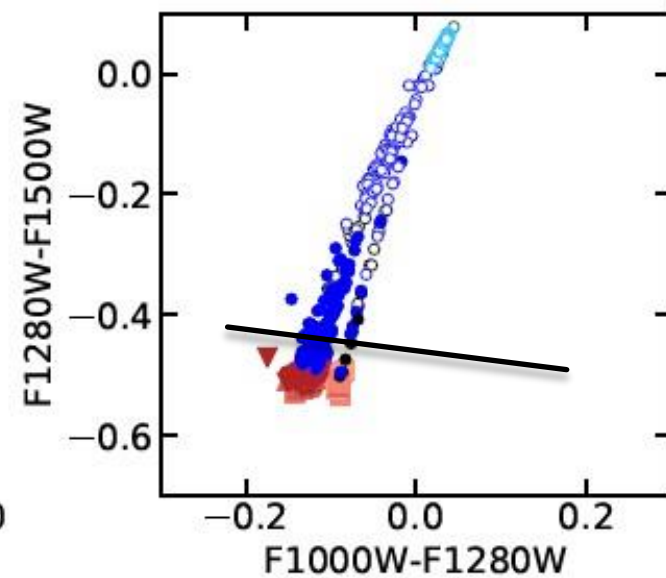
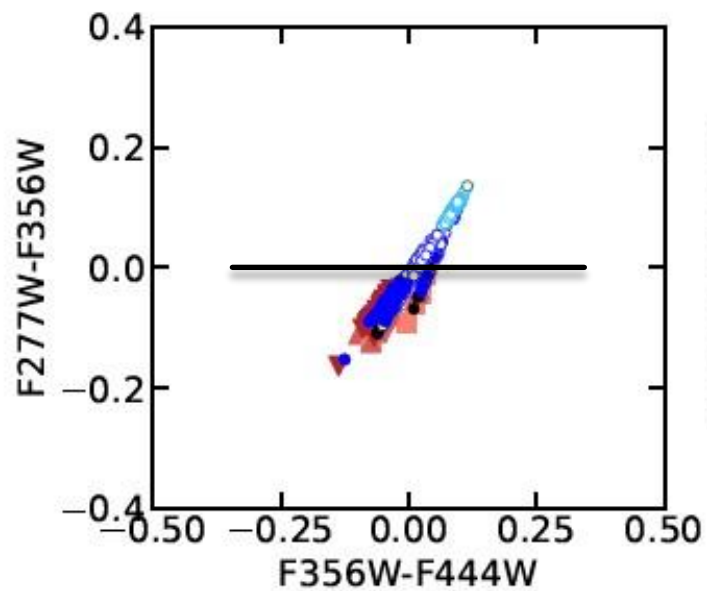
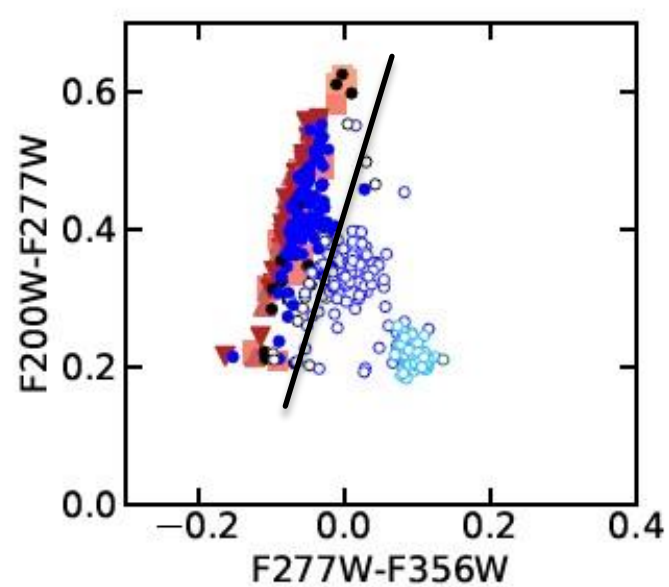
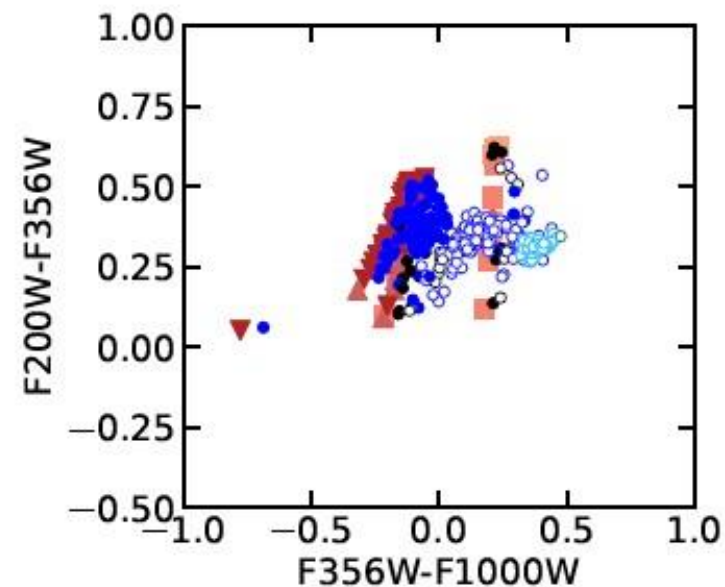
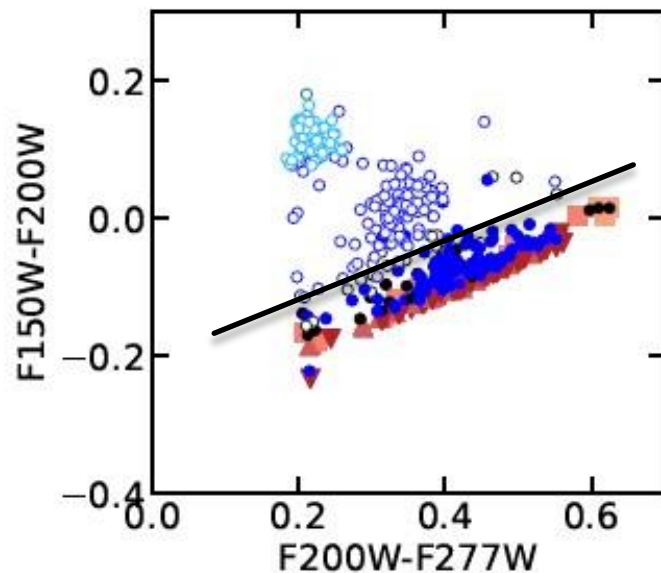
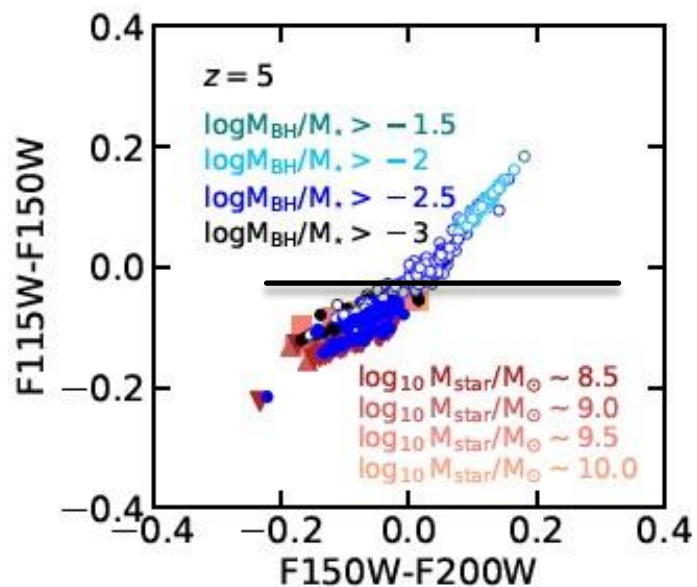


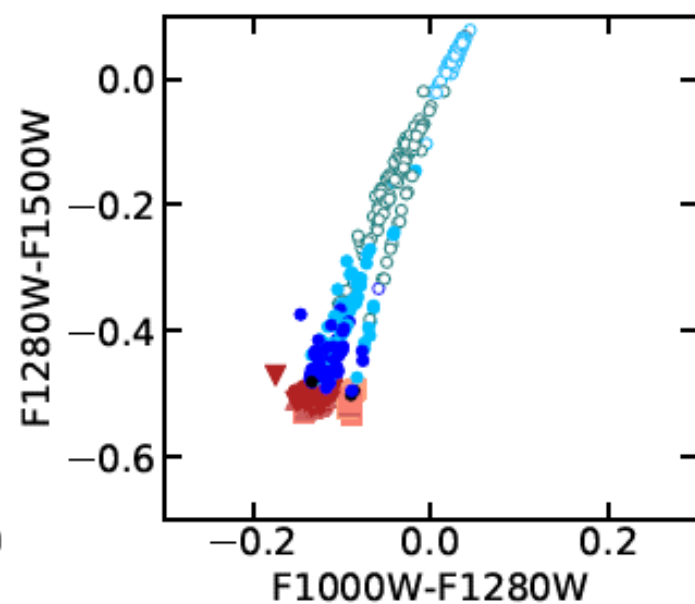
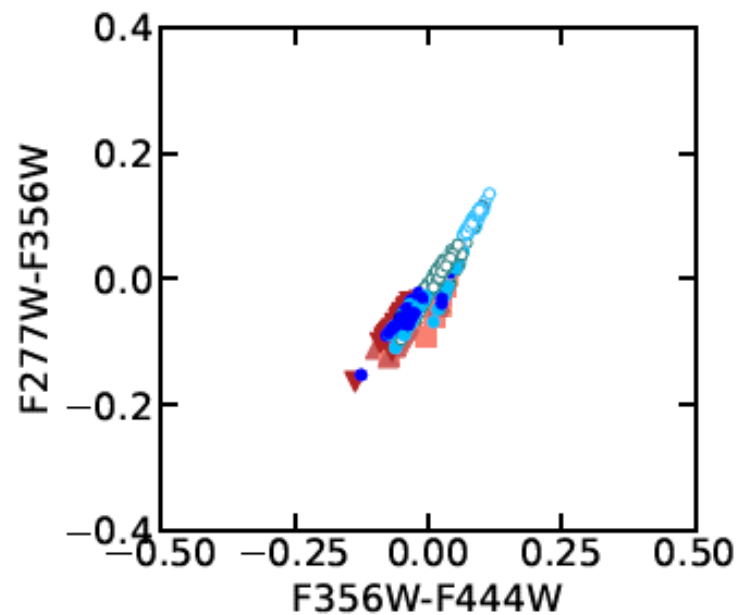
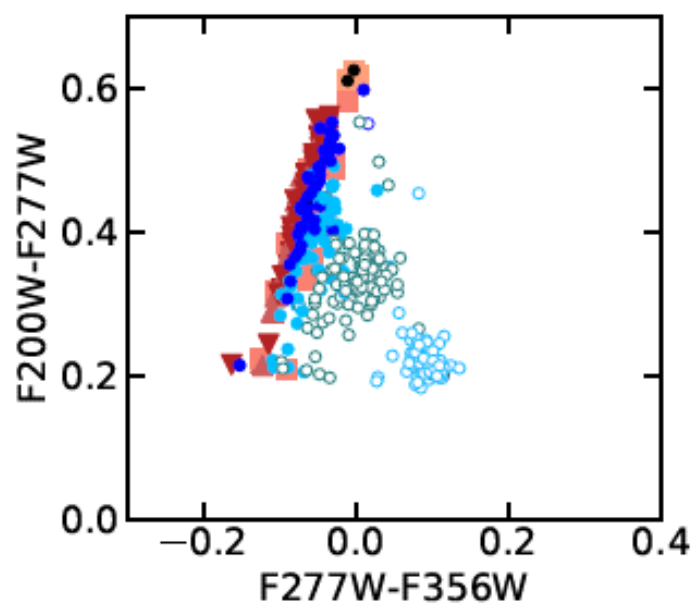
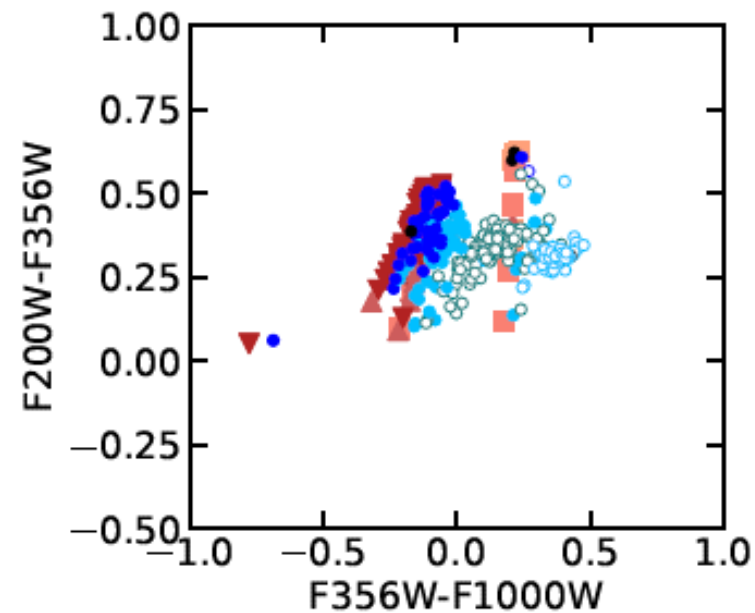
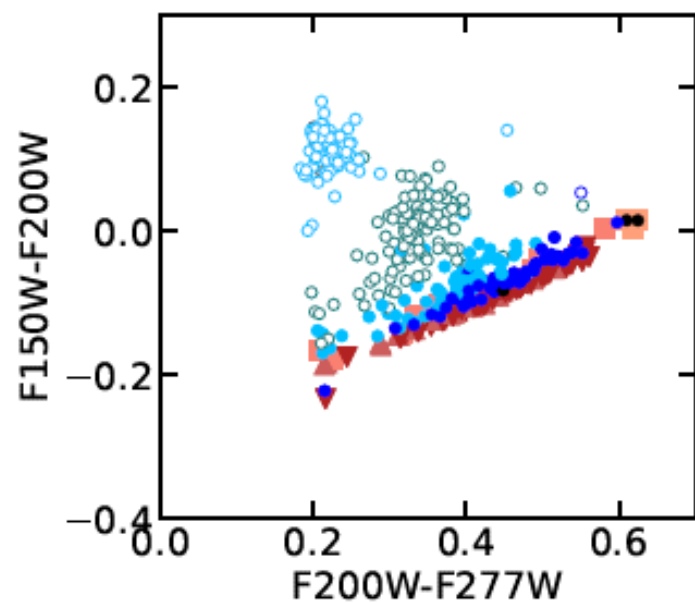
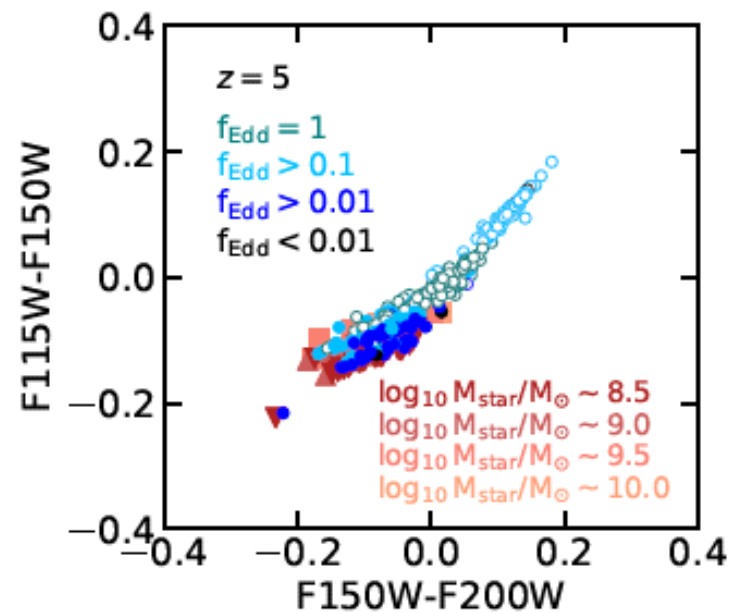


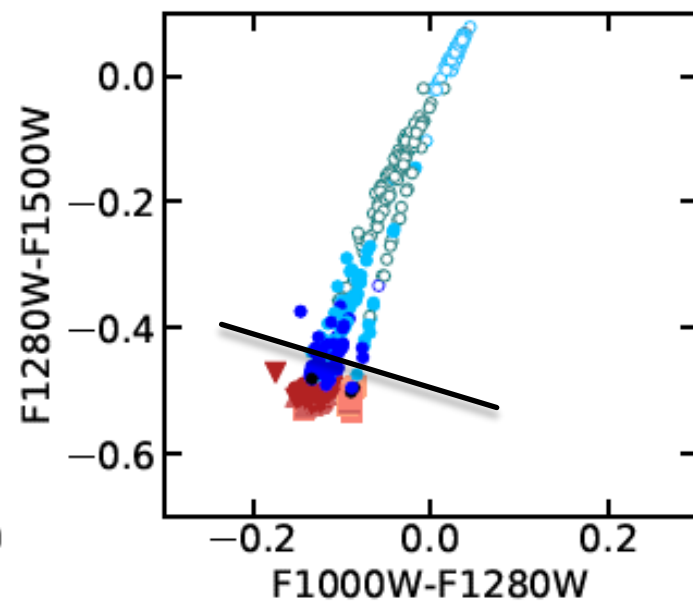
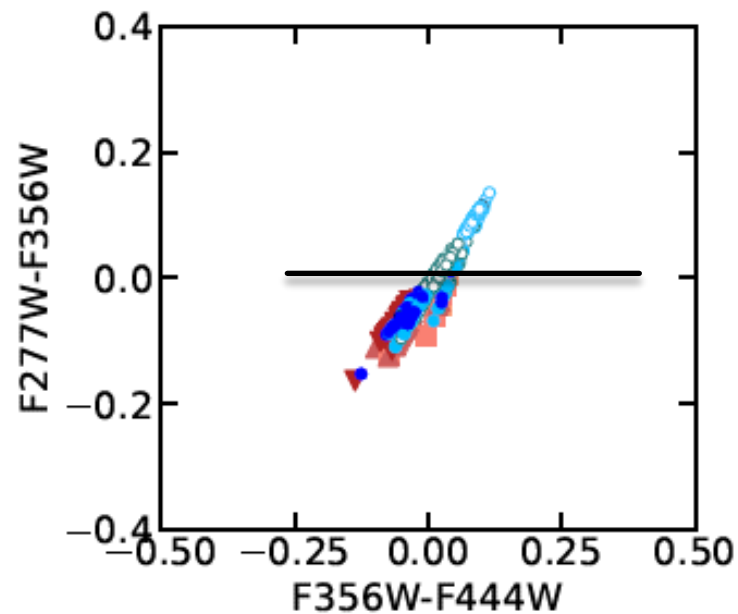
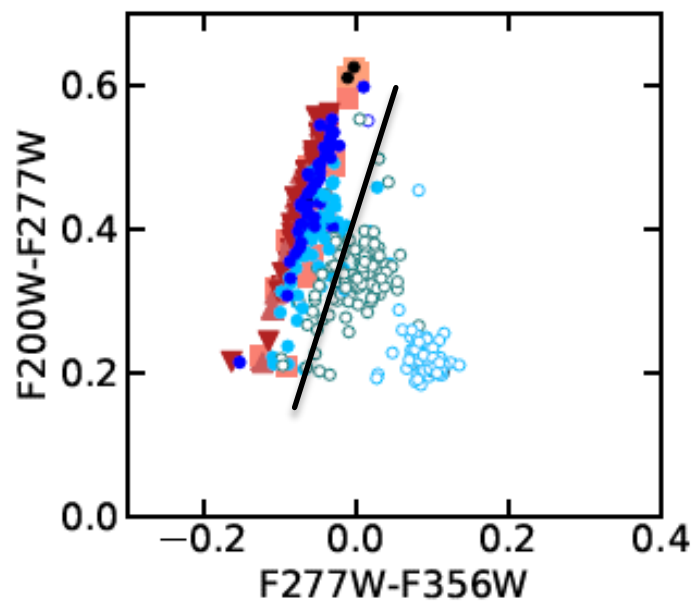
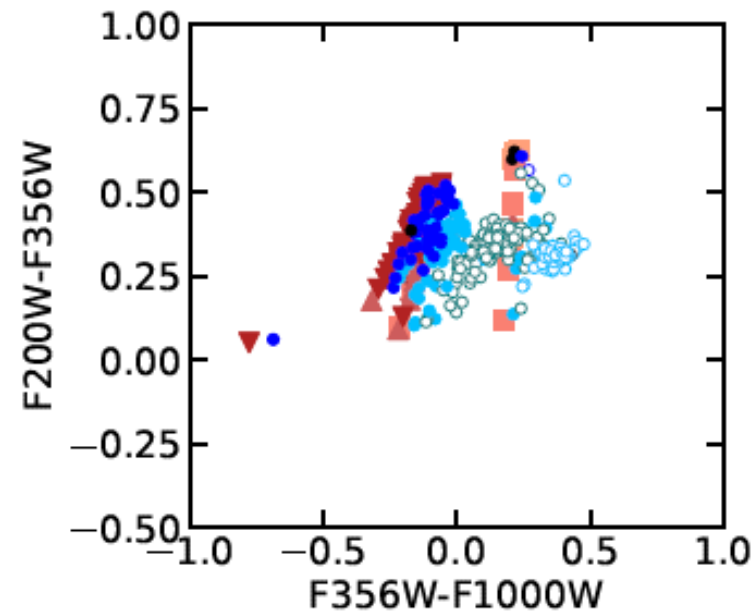
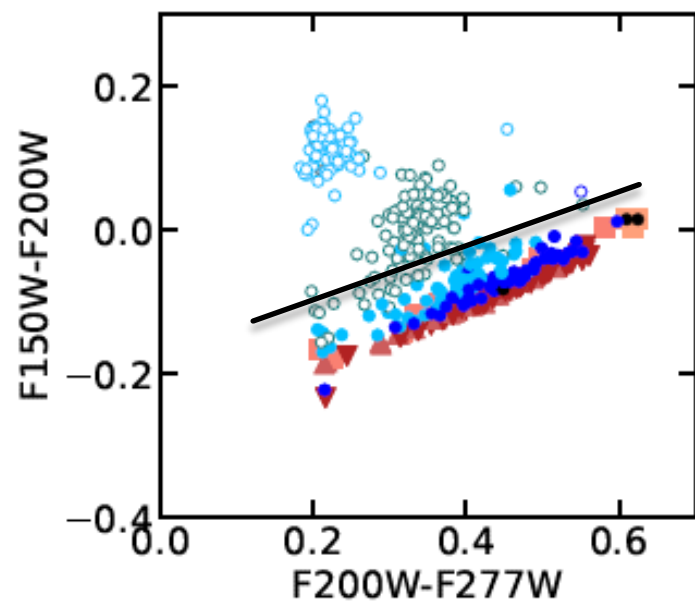
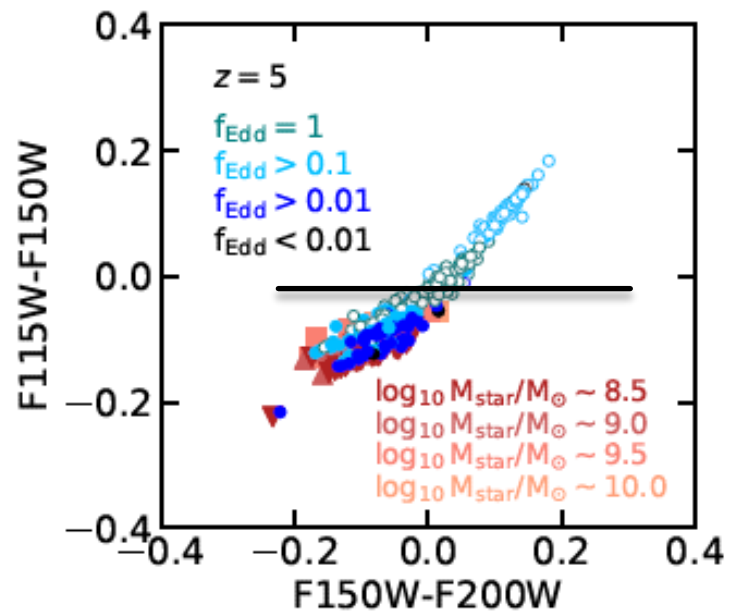


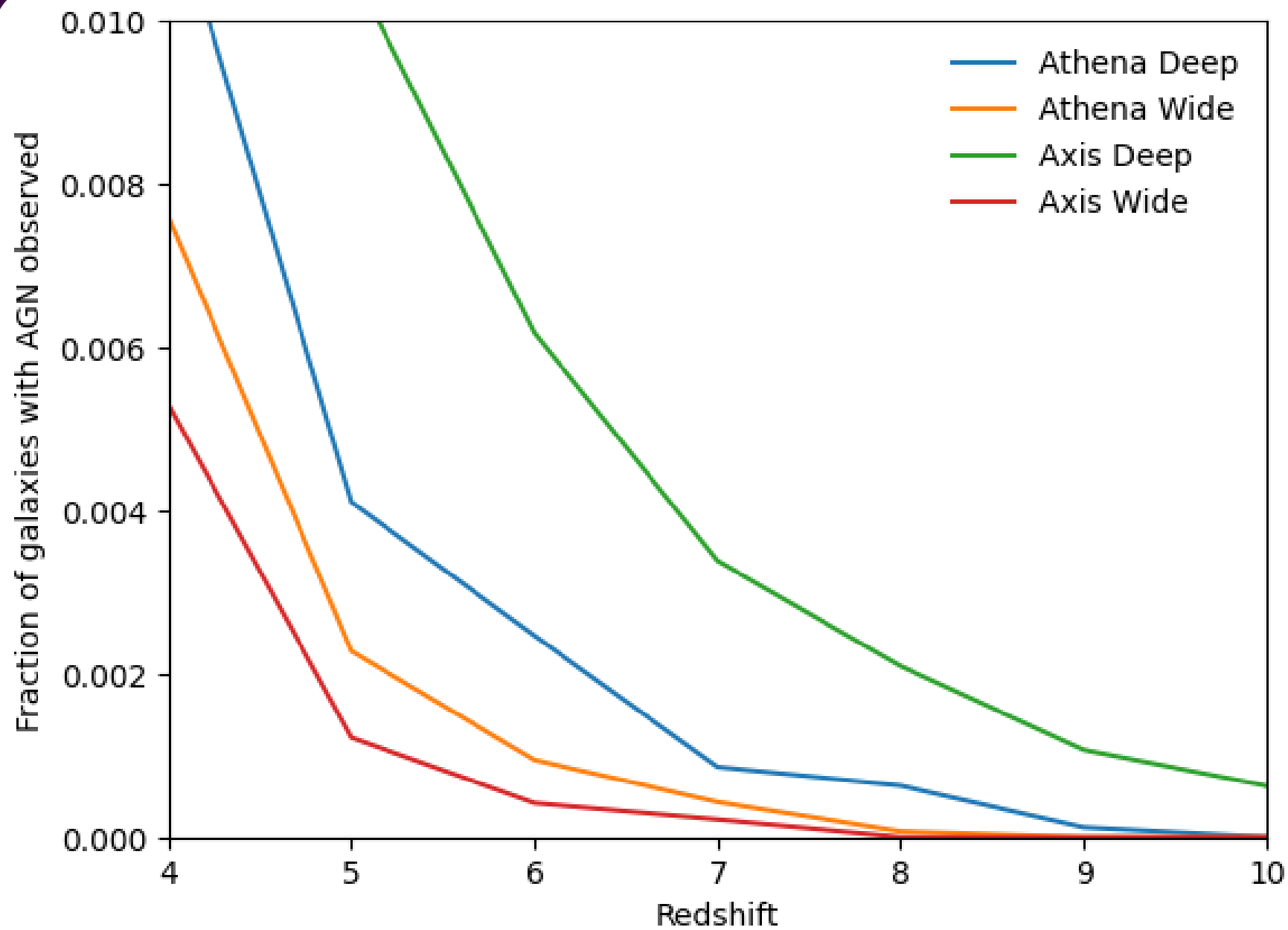












FRACTION OF
OBSERVABLE AGN

CONCLUSIONS

- **Difference** between the galaxies containing AGN and those that do not **in color-color diagrams**
- **Only over-massive or highly accreting BHs are distinguishable**
- Athena and AXIS concept missions deep surveys have the potential to see AGN up to $z=9$ and $z=10$ respectively
- **AXIS** deep survey will allow us to discover the **highest number of AGN**