BLACK HOLES: THE MYSTERIOUS MASS GAP AND THE GALACTIC SEARCH FOR THE MISSING LINK

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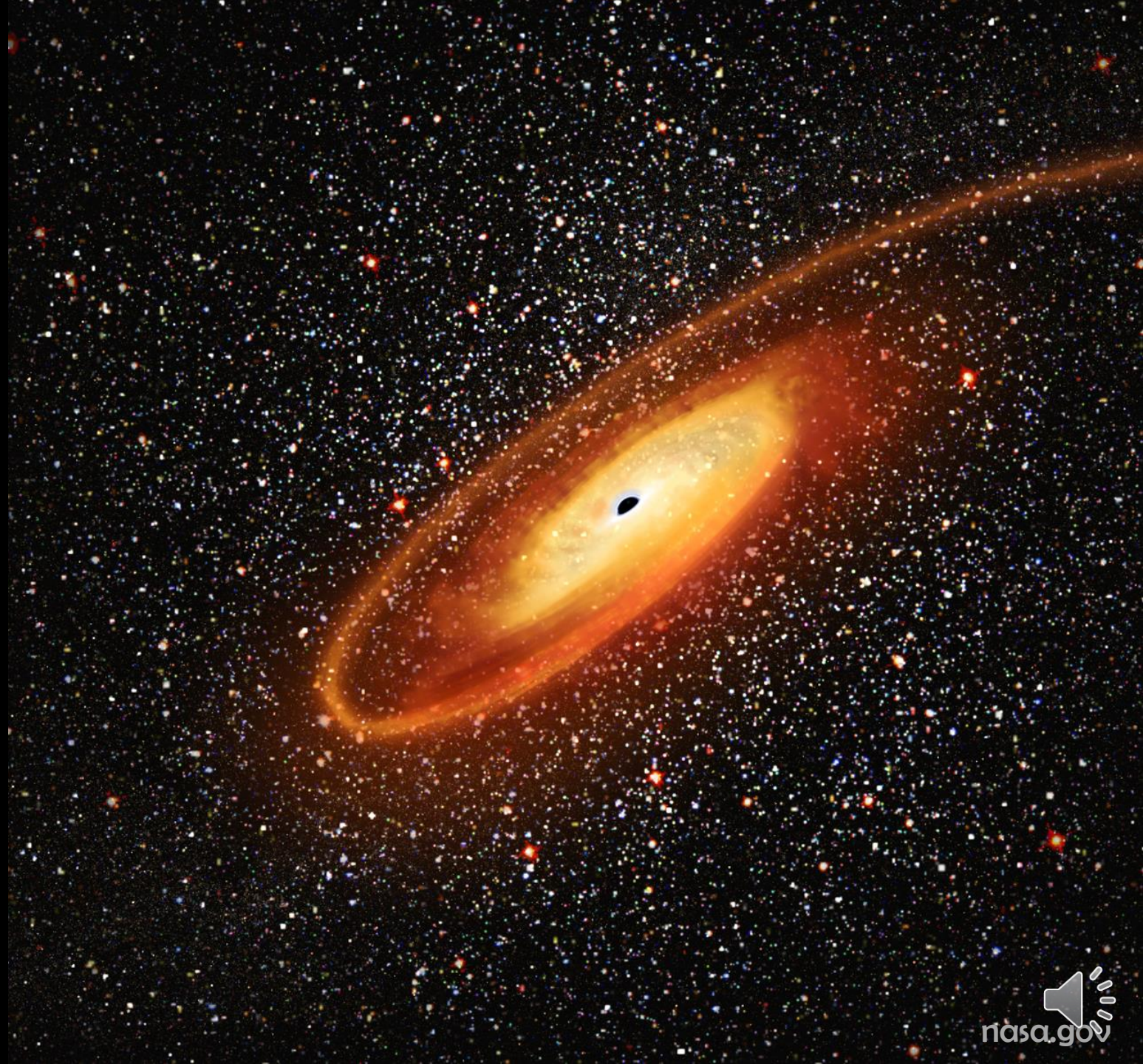
- Focuses on how galaxies evolution
- How Star Formation turns on and off in galaxies
- Morphology of low-mass galaxies

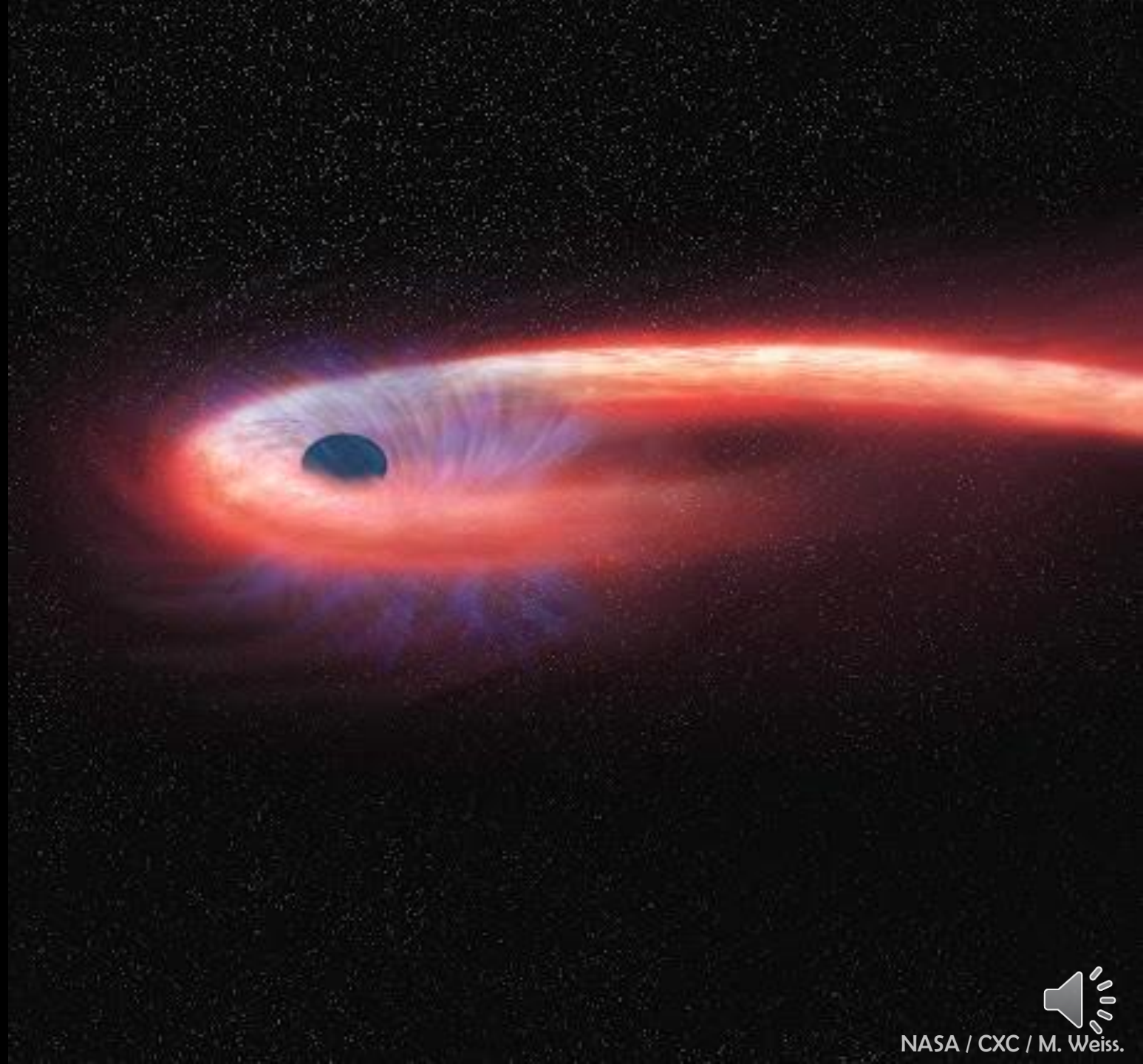
BACKGROUND

- Tidal Disruption Events (TDEs)
  - Growth after galaxies age
  - Usually in galaxies in the "Green Valley"
    - In between star forming and passive galaxies
  - Possible source for progenitor gravity waves
- Black Hole Growth
  - Feed by stars and gas
  - Stellar to Supermassive Black Holes (SMBH)
    - Very quick process
- The Mass Gap
  - Very little in between
    - Intermediate black holes



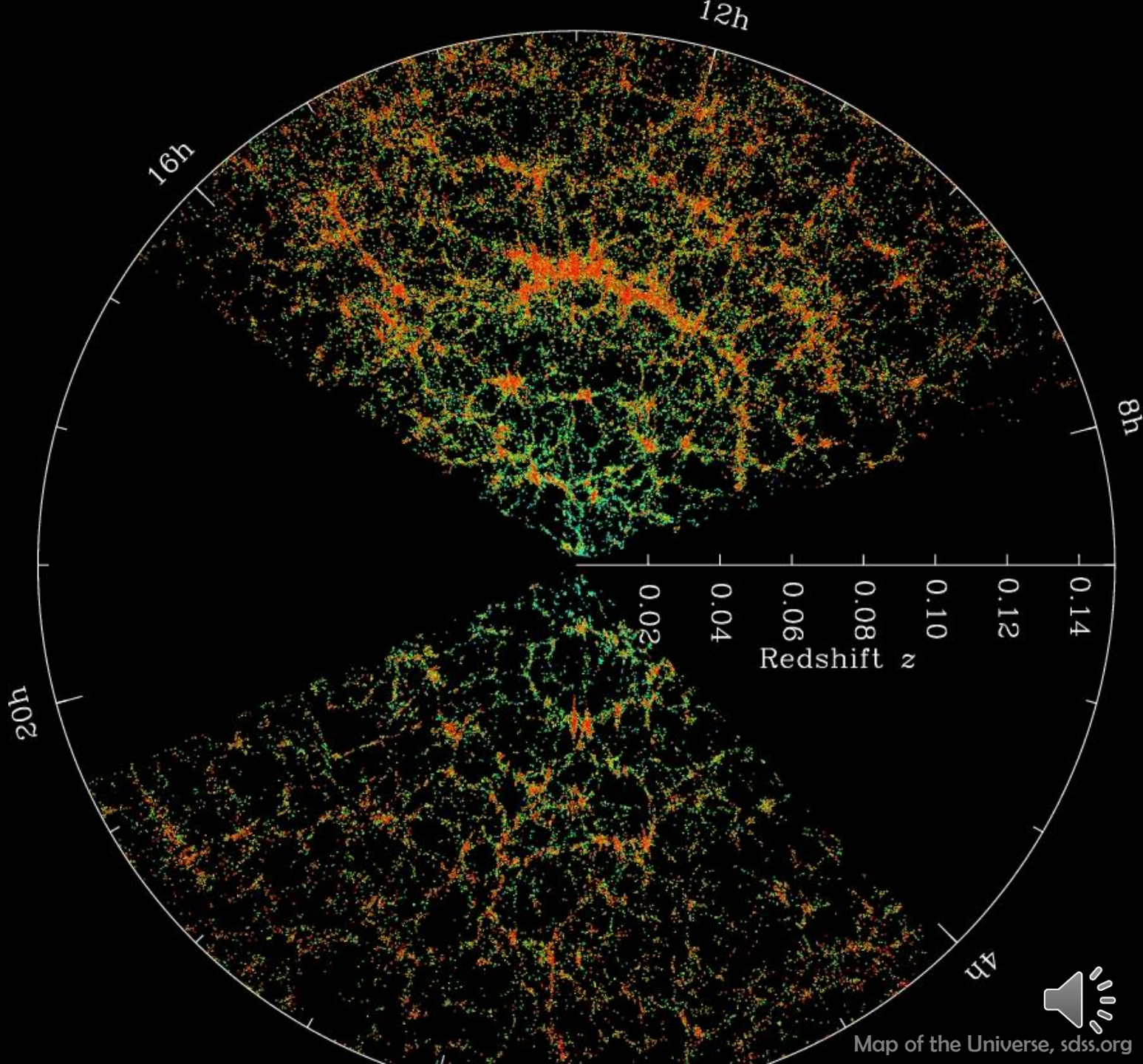
QUESTIONS

- Can TDEs explain the abnomral growth of Black Holes?
- Can we find disinct poroperties to find more "Green Valley" Host Galaxies?



METHODS

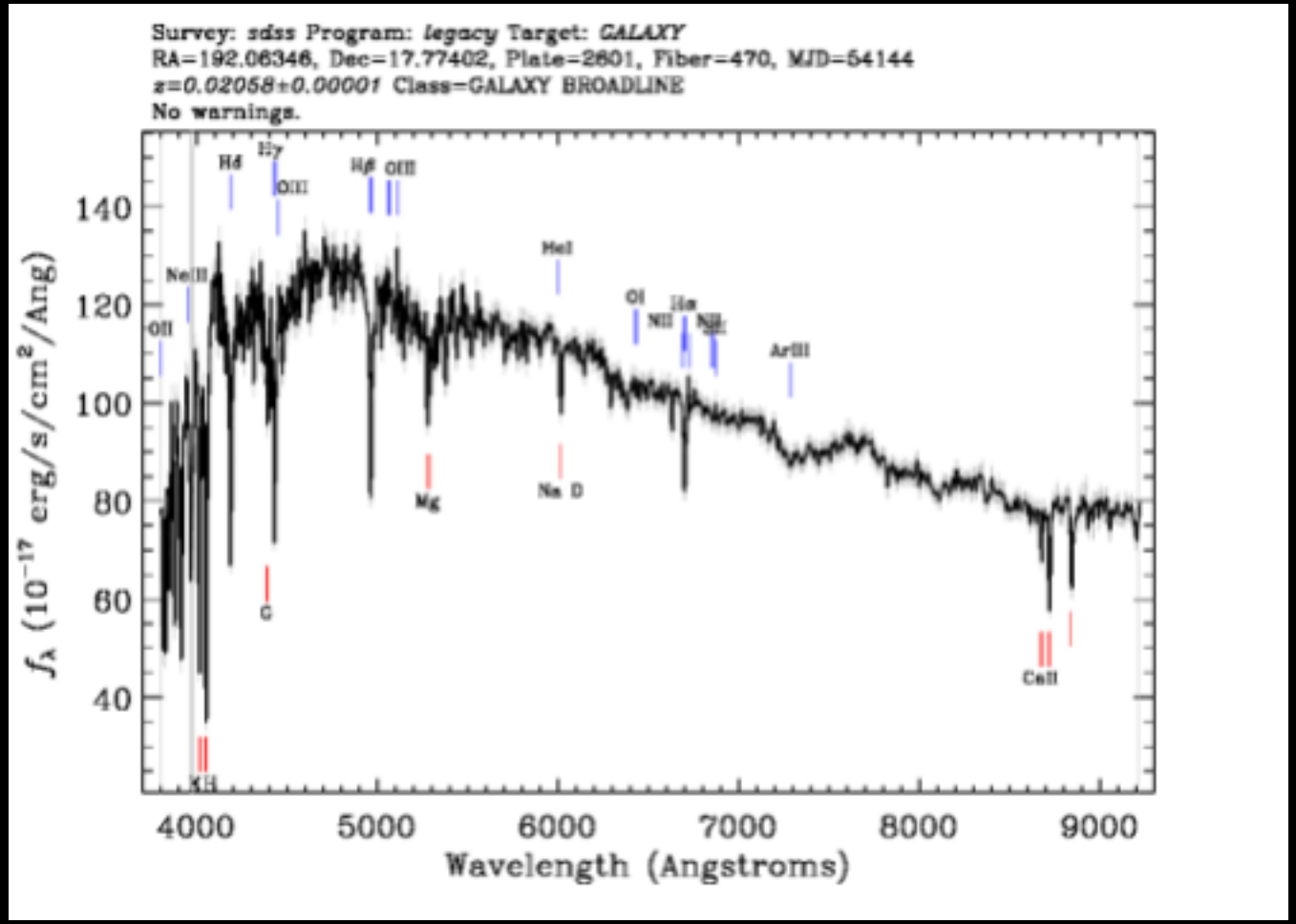
- Using Data from the Sloan Digital Sky Survey (SDSS)
- Using 50 TDE host galaxies from the Max Planck for Astrophysics (MPA) and Johns Hopkins University (JHU) Catalog



Map of the Universe, sdss.org

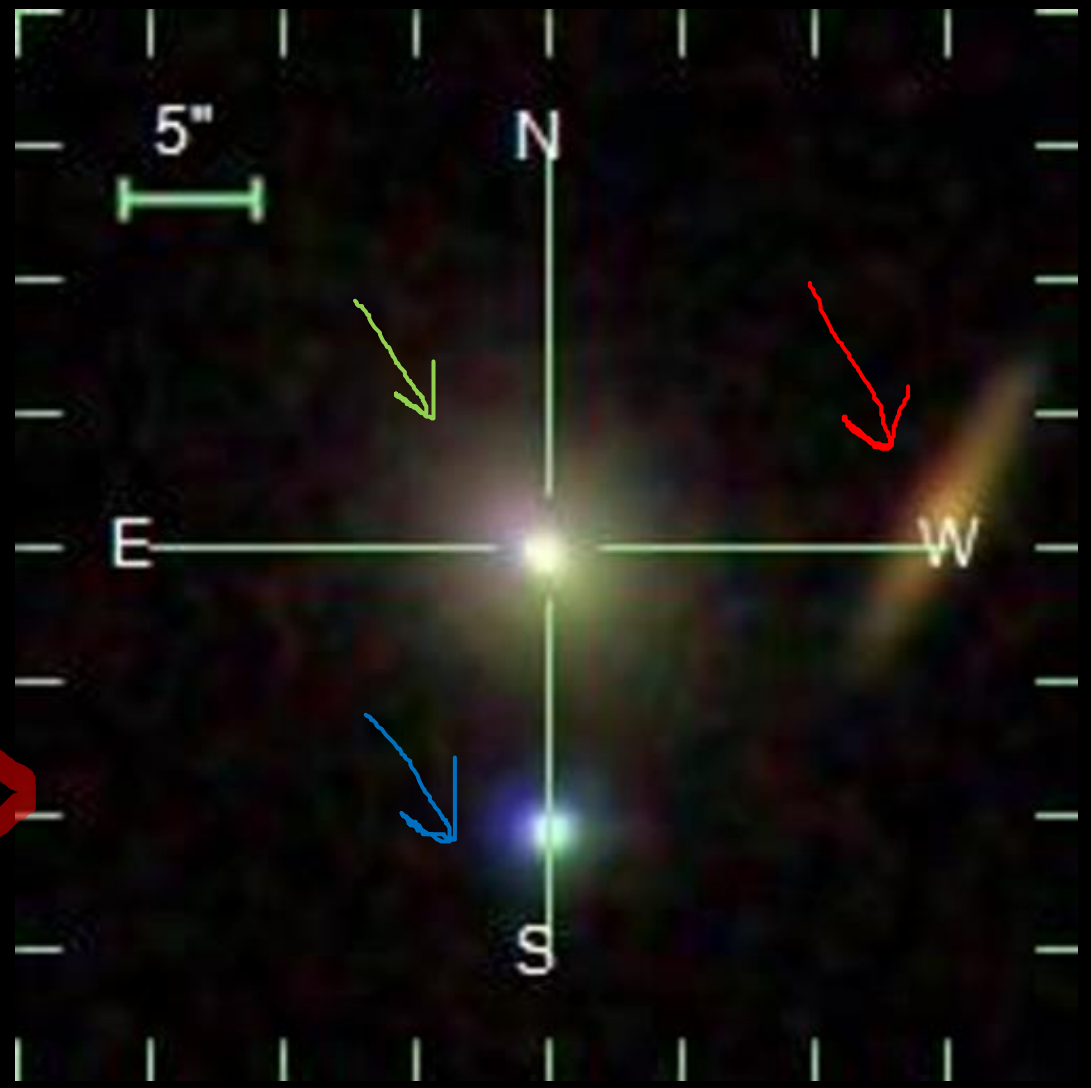
EXAMPLES

- ASASSN-14li
- Spectronomy (Visible Light)
- Higher peaks = Higher energy from wavelengths
- Higher peaks + Shorter Wavelengths = TDE activity



EXAMPLES

- ASASSN-14li
- SDSS Image
- Most Galaxies are in low redshift (close to earth)
- Most TDE Host are green in color



EXPECTATIONS & IMPLICATIONS

- Find distinct properties for TDEs host galaxies
- Find if TDEs can support Black Hole growth
  - Stellar to Intermediate to Suppermassive
- Help the study for gravitaional waves
  - LIGO and VIRGO

WHAT'S NEXT?

- Collect more data on TDEs
- Find more TDE host
- Complete Data sets
- Get more info afte James Webb Launch (Expected November 2021)
  - *Been delayed 4 times for about 14 years at this point

THANK YOU!

Dr. Yicheng Guo

Brian Booton &
MARC/IMSD

Office
of Undergraduate
Research

Christi Francois
(Mom) & Family