Galaxy Formation and Evolution with Nancy Grace Roman Space Telescope

Brant Robertson (UC Santa Cruz)
Roman Extragalactic Potential Observations (EXPO)
Science Investigation Team
Billions of years ago

Recombination

Big Bang

Neutral IGM

Cosmic “Dark Ages”

First stars

First galaxies

Reionization

Modern galaxies form

Present day

Adapted from Robertson ARAA, in press
A New “Golden Age” for Extragalactic Astronomy

Observations with Nancy Grace Roman Space Telescope, ALMA, JWST, Rubin, Subaru/PFS, and GMT/TMT will drive astronomical discoveries over the next decade.

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Roman ExGal Science Questions

• How will Roman help us understand galaxy properties in the context of their environments over cosmic time?

• What will Roman spectroscopy teach us about galaxy properties and evolution during the peak era of cosmic star formation?

• How can we leverage Roman to discover and characterize rare AGN and quasars?

• Will the massive sample of gravitational lenses discovered by Roman inform us about the properties of dark matter?

• Can we quantify the importance of galaxies and quasars for reionization through the statistical samples finally delivered by Roman?

• Will Roman discover enough exotic, distant supernovae to tell us about the fates of early stellar populations?
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Science Investigation Team

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Today’s Briefing
https://roman.gsfc.nasa.gov/science/workshop112021/agenda.html#expo

- Nicole Drakos (UCSC): Deep Realistic Extragalactic Model - Simulating a Roman Ultra Deep Field
- Mark Dickinson (NOIR Lab): Notes on Deep Roman WFI Grism Survey Observations
- Harry Ferguson (STScI): Nearish-field Cosmology with Semi-Resolved Dwarf Galaxies
- Allison Strom (Princeton): The fingerprints of galaxy assembly with PFS and Roman
- Adam Trapp (UCLA): Connecting Galaxies to the Cosmic Web
- BREAK
- Steve Furlanetto (UCLA): Learning Galaxy Physics During the Cosmic Dawn with Roman Deep Fields
- Ryan Endsley (Arizona): A Wide-area View on Reionization — Identifying and Mapping the Largest Ionized Bubbles
- Alice Shapley (UCLA): EXPO-Keck Spectroscopic Campaign
- Takashi Moriya (NAOJ): Discovering Supernovae at Epoch of Reionization with Nancy Grace Roman Space Telescope