Through the Cosmic Lens: Deep Dive into Resolved Stellar Populations

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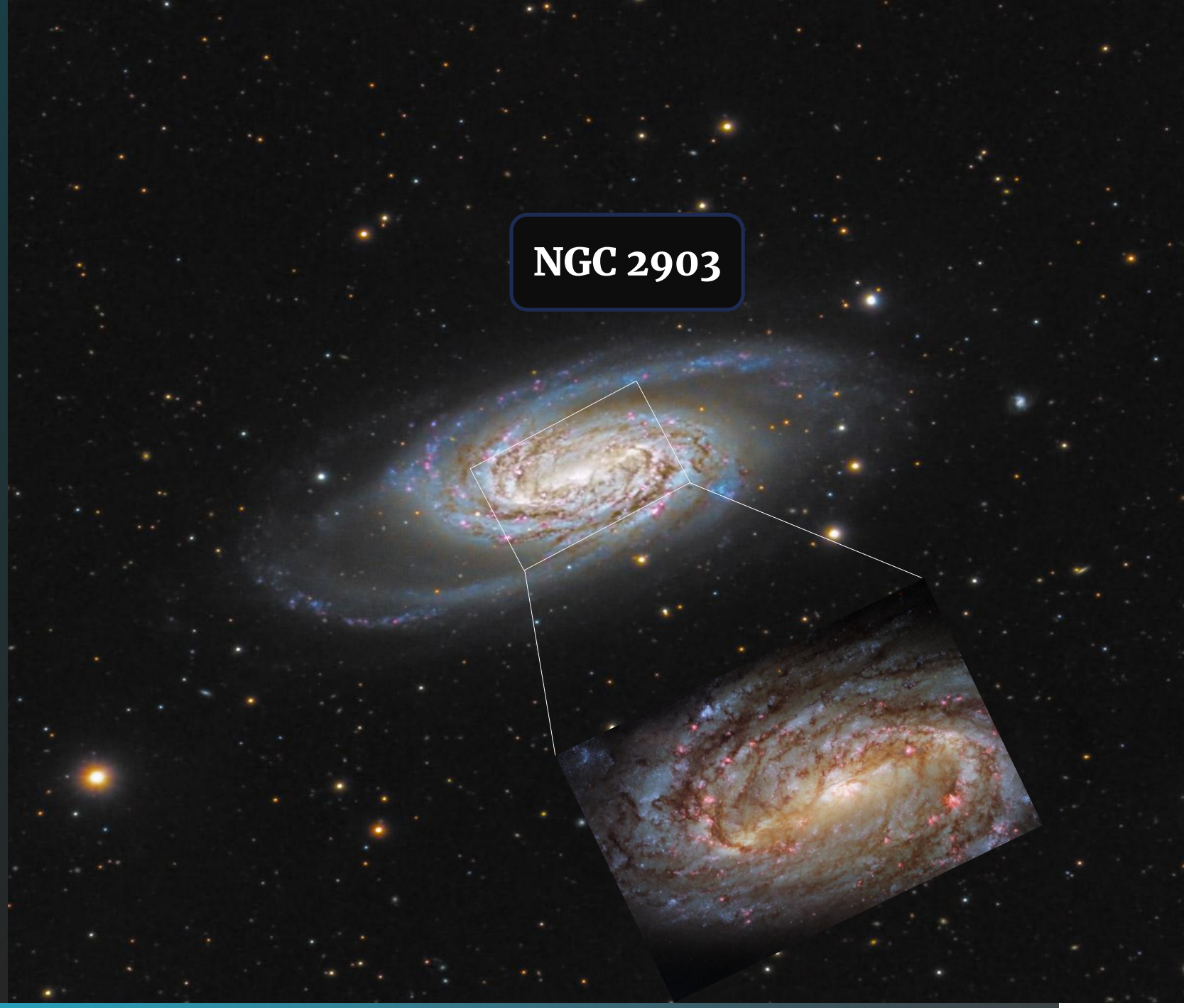


Project Goals and Scientific Motivation

Galaxy formation and evolution

Morphology and demographics of SP

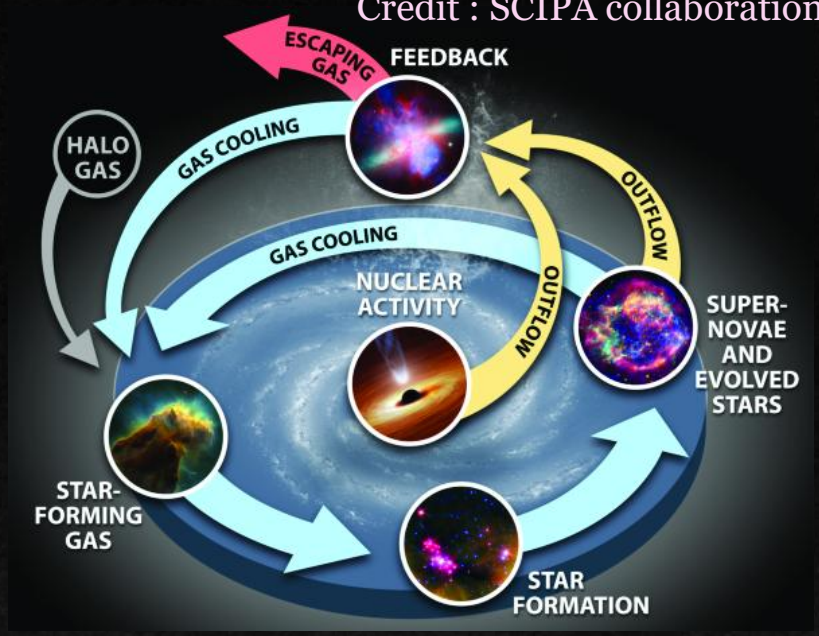
Baryon Cycle of stars - SFH

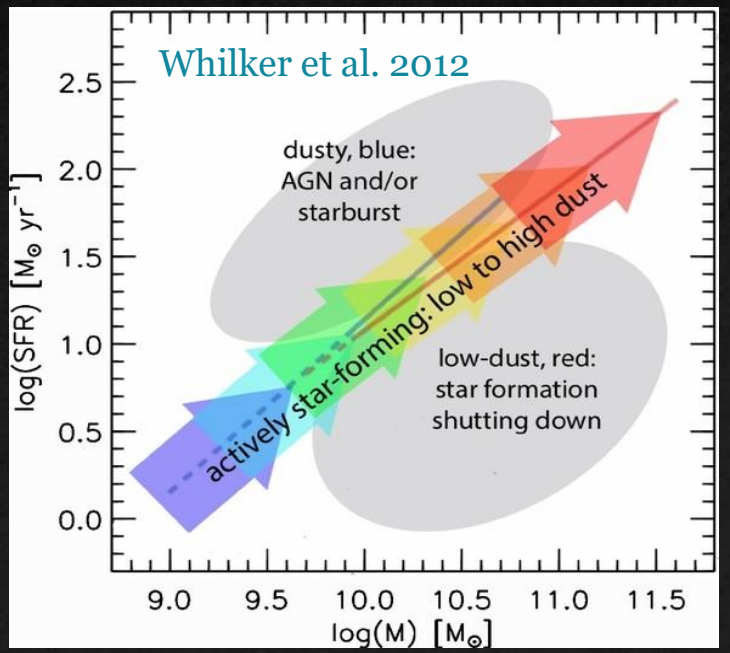
Metallicity variation – insitu SFH or radial migration

Age gradient – inside out formation scenario

Nearby Galaxies

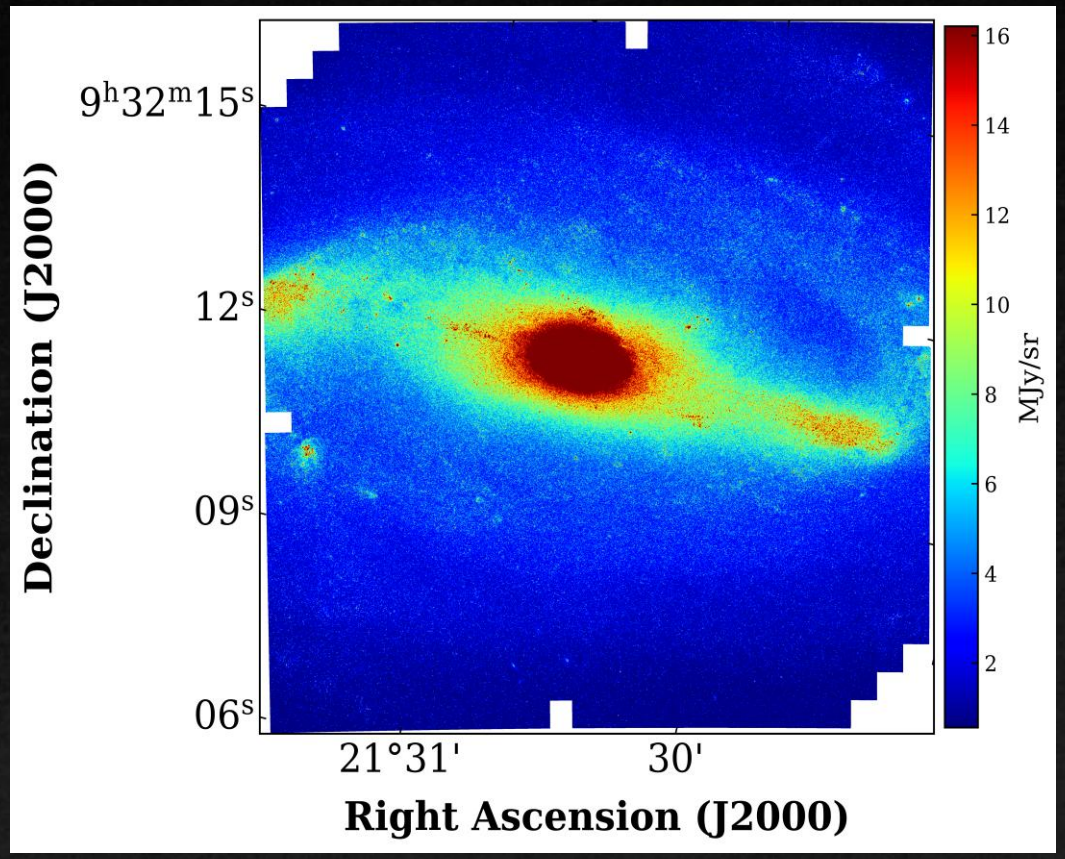
Credit : SCIPA collaboration





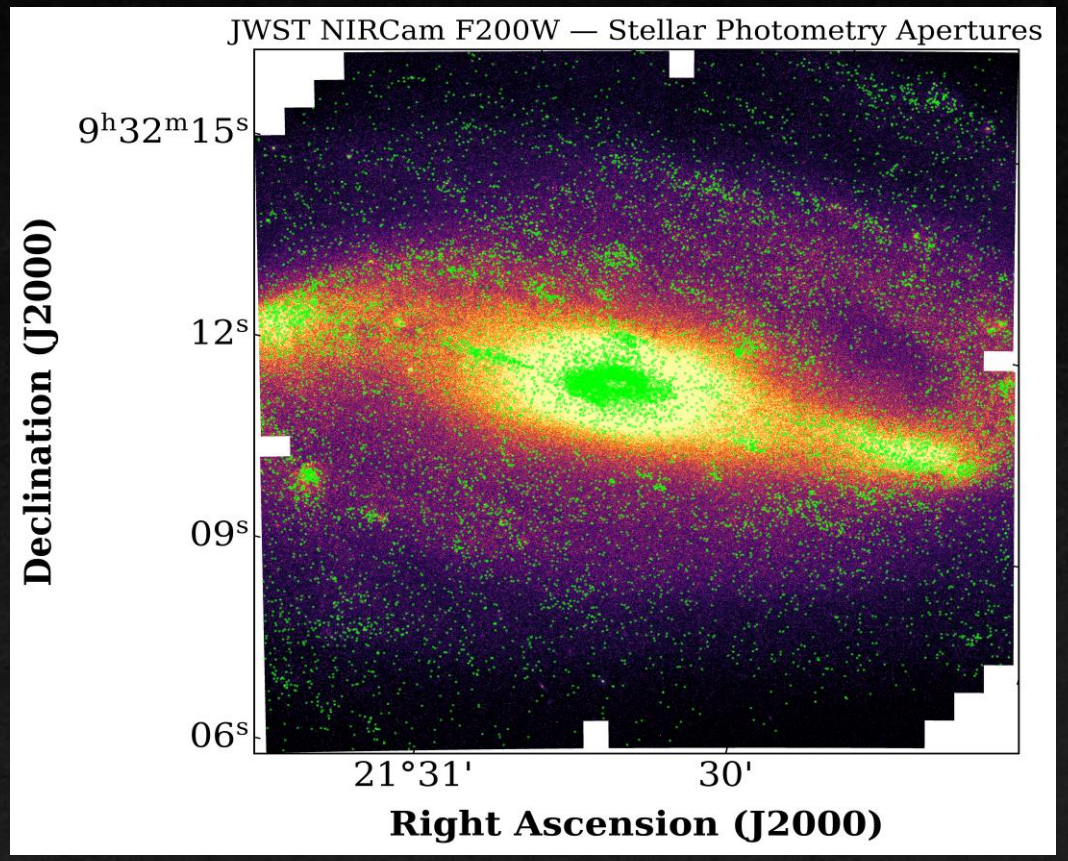
Unveiling the Star Formation Next Door

Sample data



JWST/NIRCam F200W image of NGC 2903

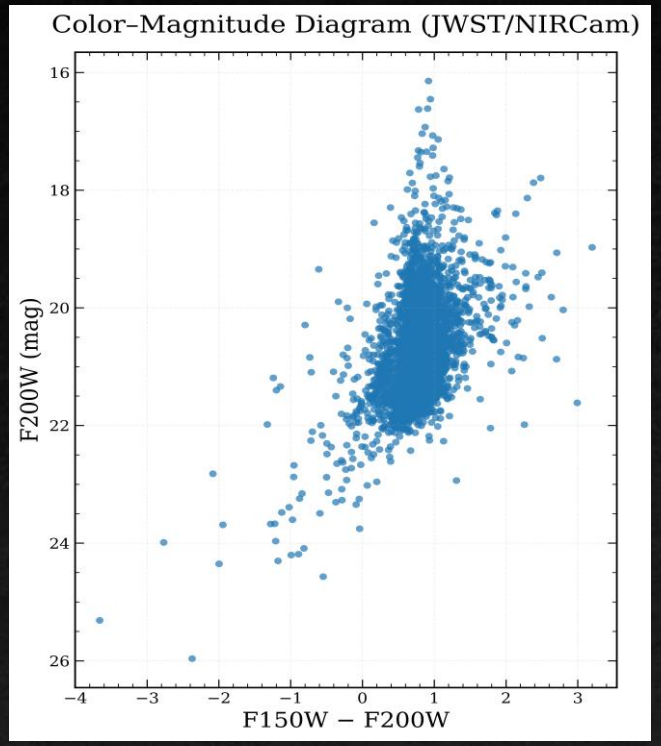
Source Detection



Identified stars plotted over galaxy image

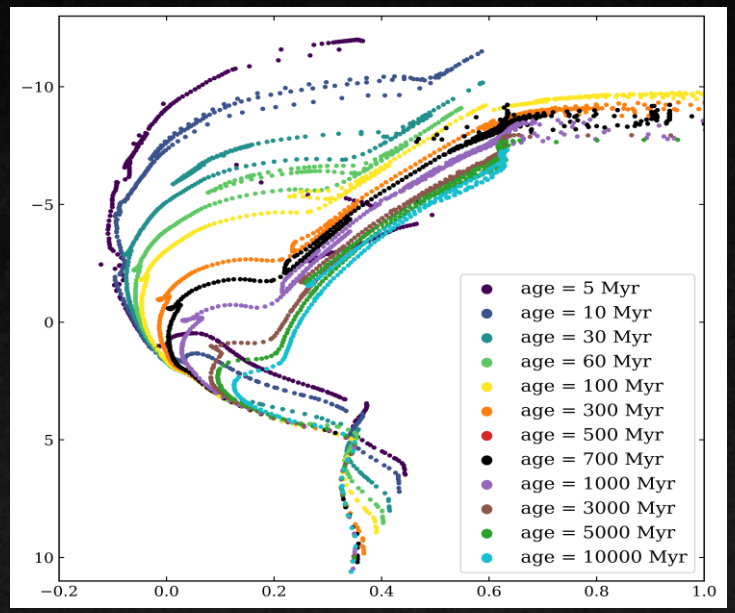
From Observation to Understanding

Observed CMD



Color Magnitude Diagram for identified stars within galaxy

Theoretical Isochrones

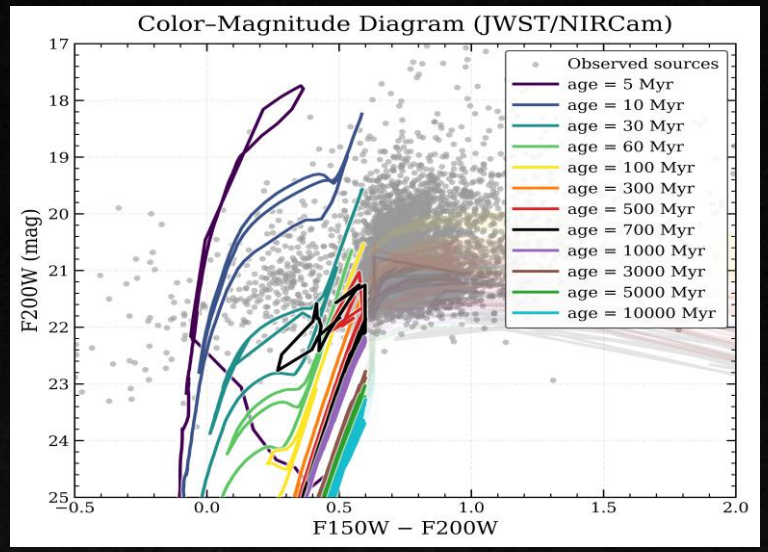


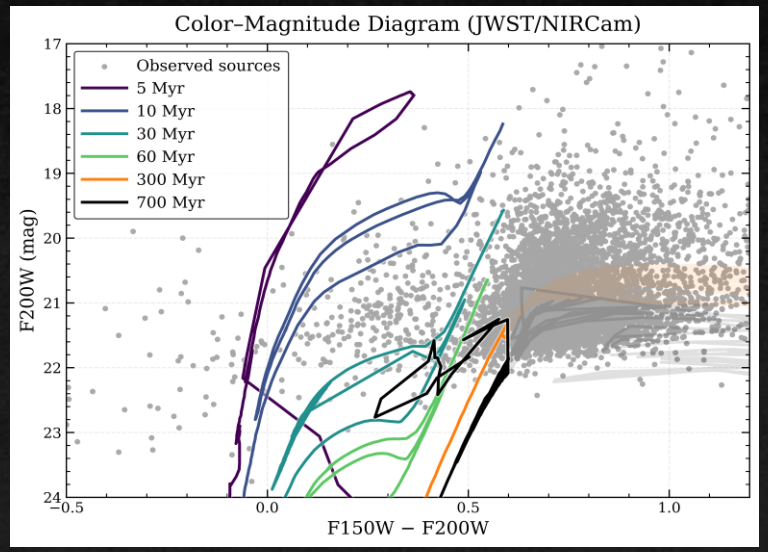
PARSEC-COLIBRI isochrones

Metallicity – 0.02 (Solar)

IMF – Kroupa (2001)

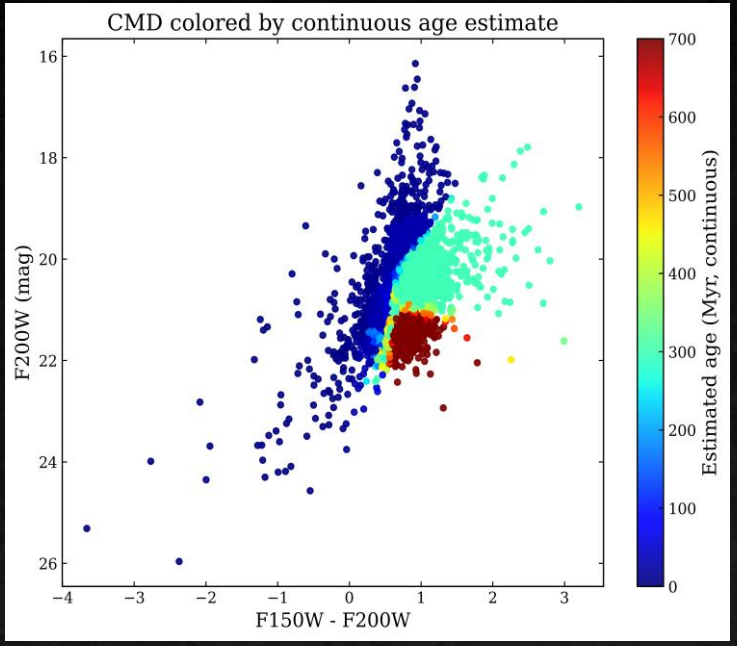
E(B-V) = 0.03, m-M = 29.74



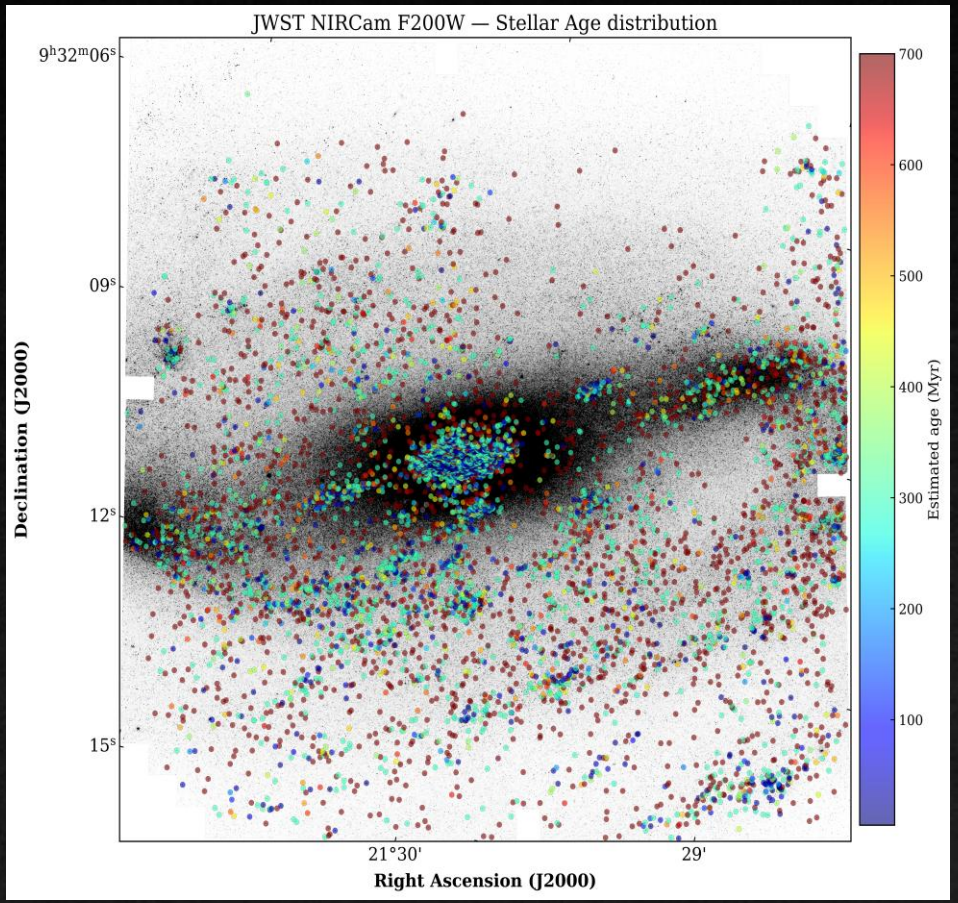


Observations + Theoretical tracks analysis

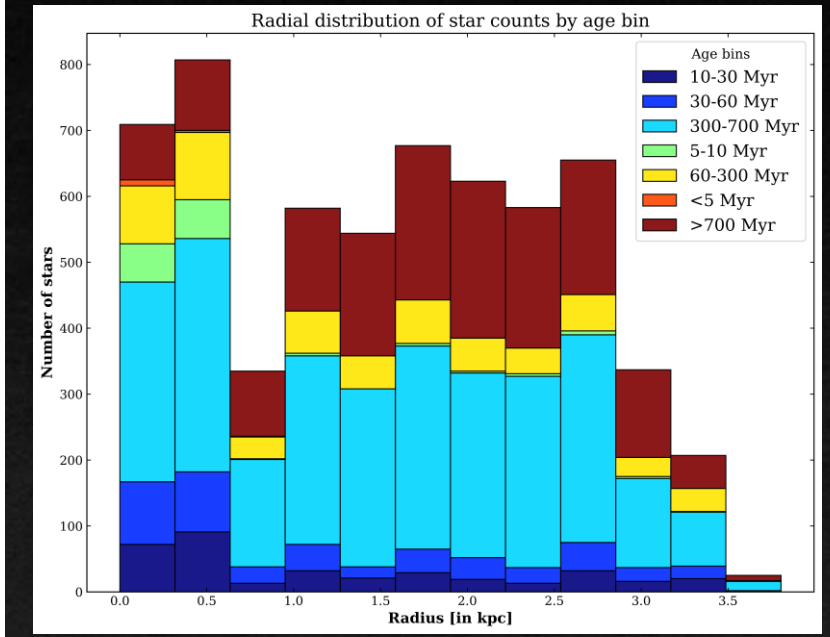
Result : Age distribution



Continuous stellar age distribution on CMD



Age distribution across the galaxy



Histogram of radial age distribution

Journey Beyond the Stars

Dust and PAH detection and distribution

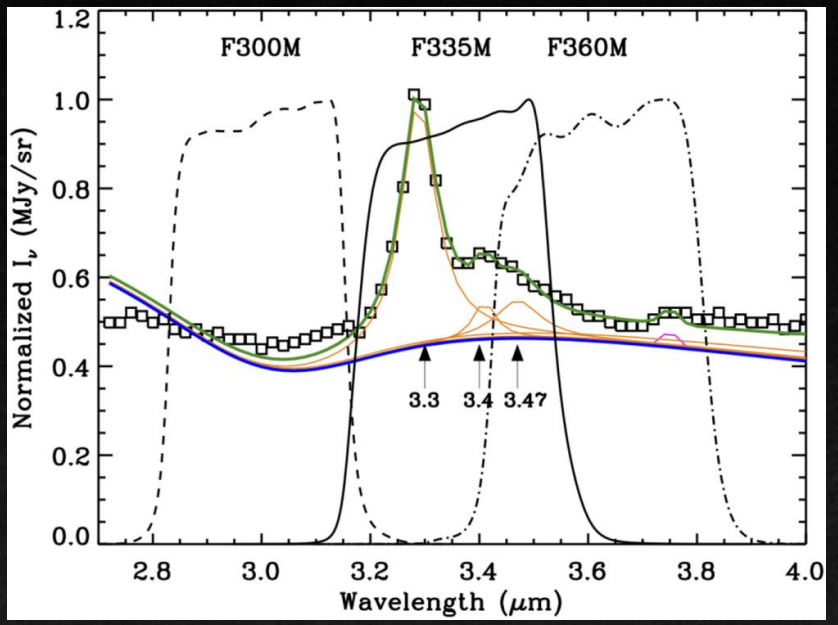
Formation mechanism of PAH – Chemical perspective

Type of dust that dominates the ISM
Fraction of dust in the form of PAHs,
R_{PAH} = (F770W + F1130W)/F2100W

Balance b/w PAH formation and destruction in HII regions

and much more.....

Sandstrom et al. 2023



NIRCam F300M, F335M, and F360M wavelength coverage, showing PAH, aliphatic and Pfund γ emission