Growing the Seeds of Cosmic Dawn:
Environmental Impact on Stellar Mass Assembly

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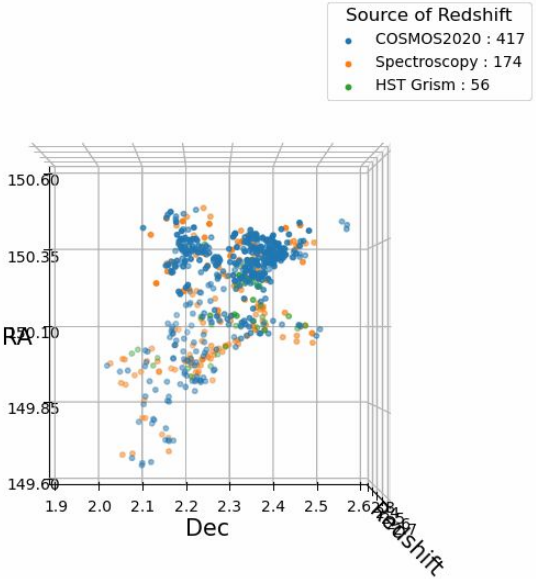
Goals of the Study

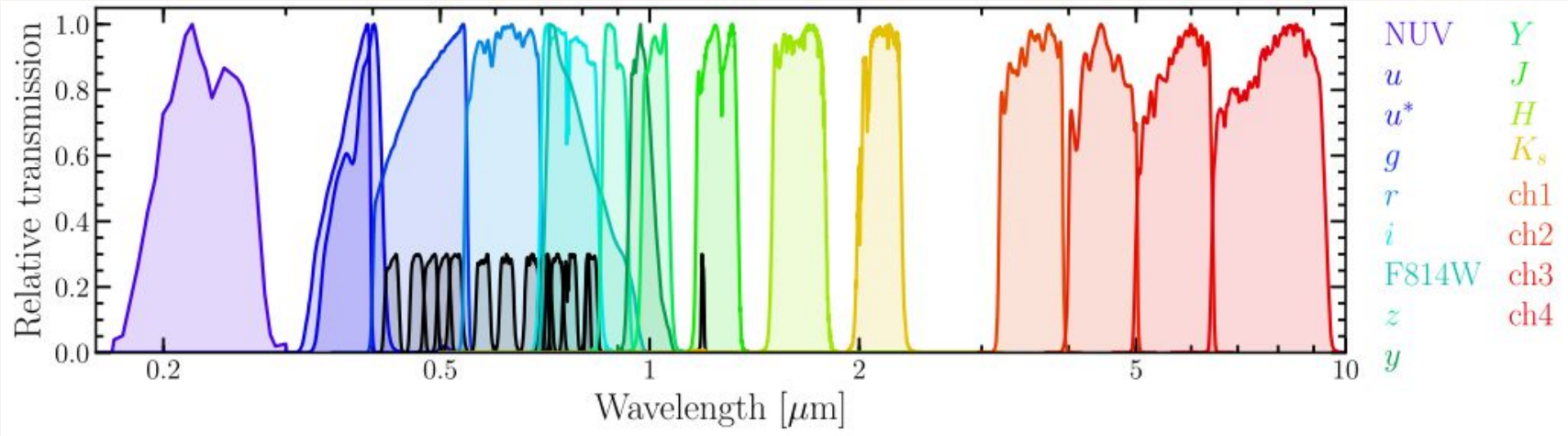
Is stellar mass assembly different in overdense environments at high redshifts?

- Examine the stellar mass function (SMF) of Hyperion and a comparison field
- Determine if SFH of galaxies differ in overdense versus underdense regions



Data

1. COSMOS2020 photometry
   → Weaver et al., 2022



Weaver et al., 2022

Data

1. COSMOS2020 photometry

2. **Ground-based spectroscopy**
   → **2078 usable redshifts in range**
   $2 \leq z_{spec} \leq 3$

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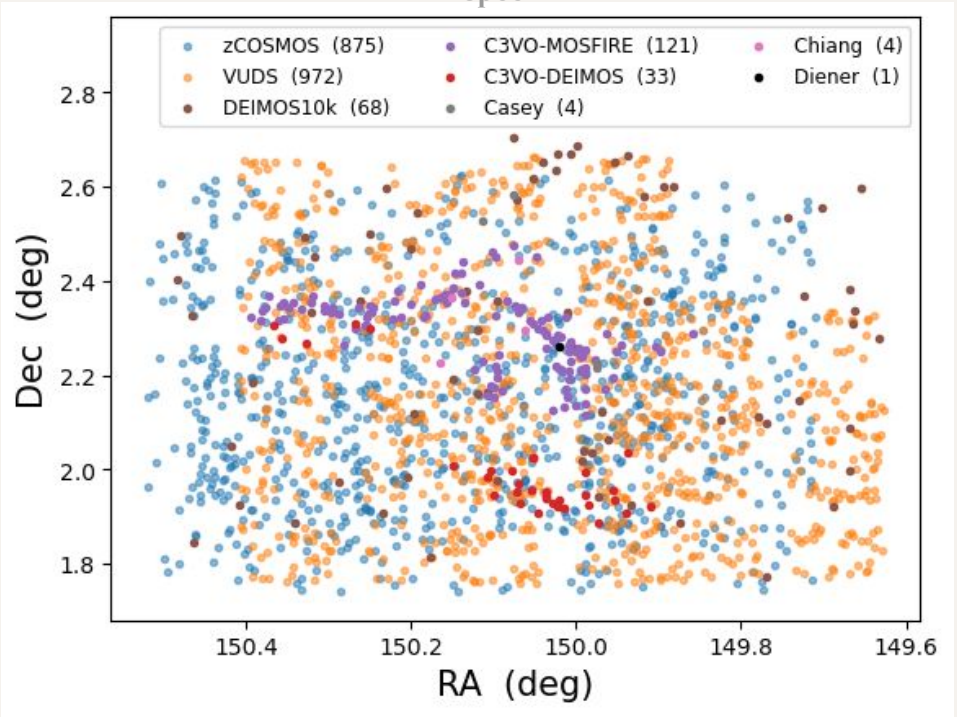

Data

1. COSMOS2020 photometry

2. Ground-based spectroscopy
   → 2078 usable redshifts in range
   $2 \leq z_{spec} \leq 3$

3. ***HST*** **grism spectroscopy**
   → 580 usable redshifts in range
   $2 \leq z_{spec} \leq 3$

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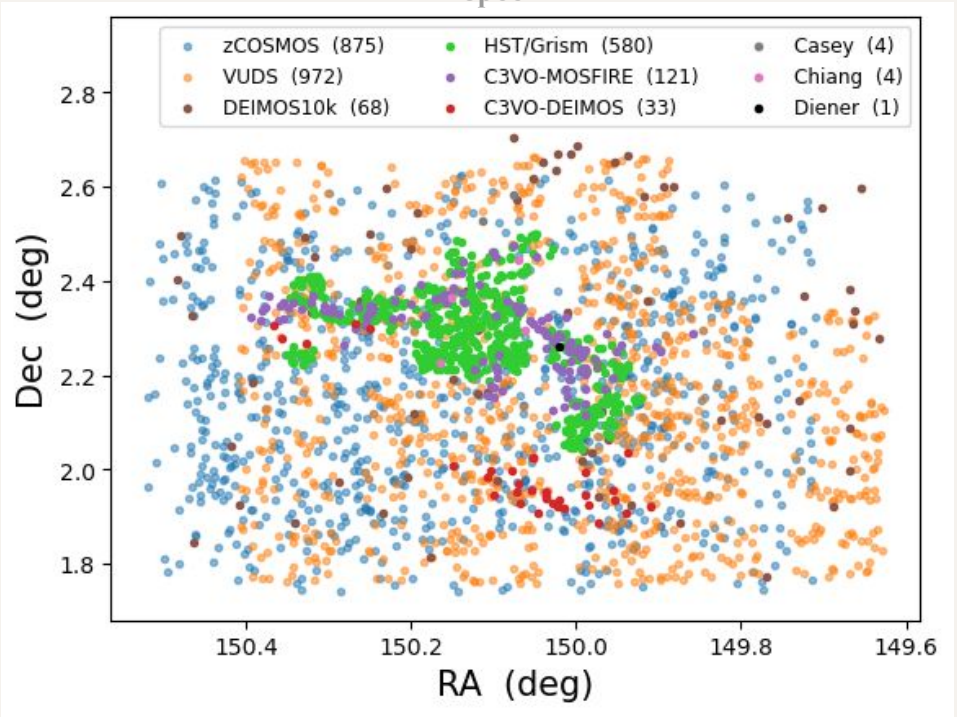

General Method

Generate 100 Monte Carlo Realizations

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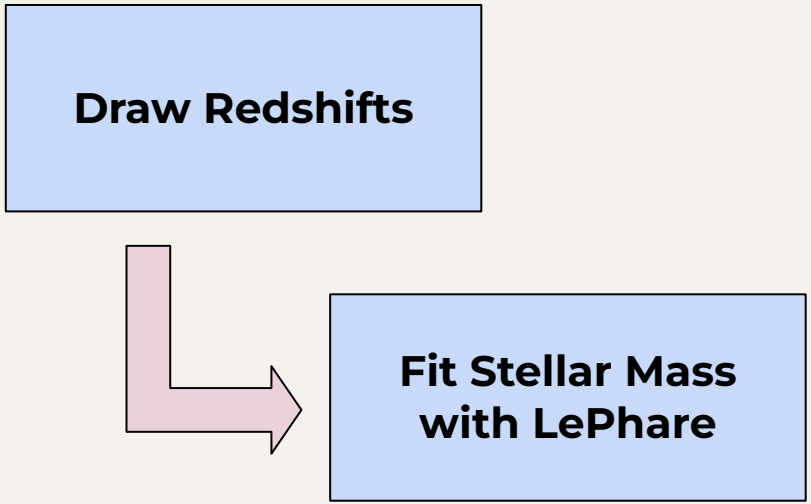
Draw Redshifts

General Method

Generate 100 Monte Carlo Realizations



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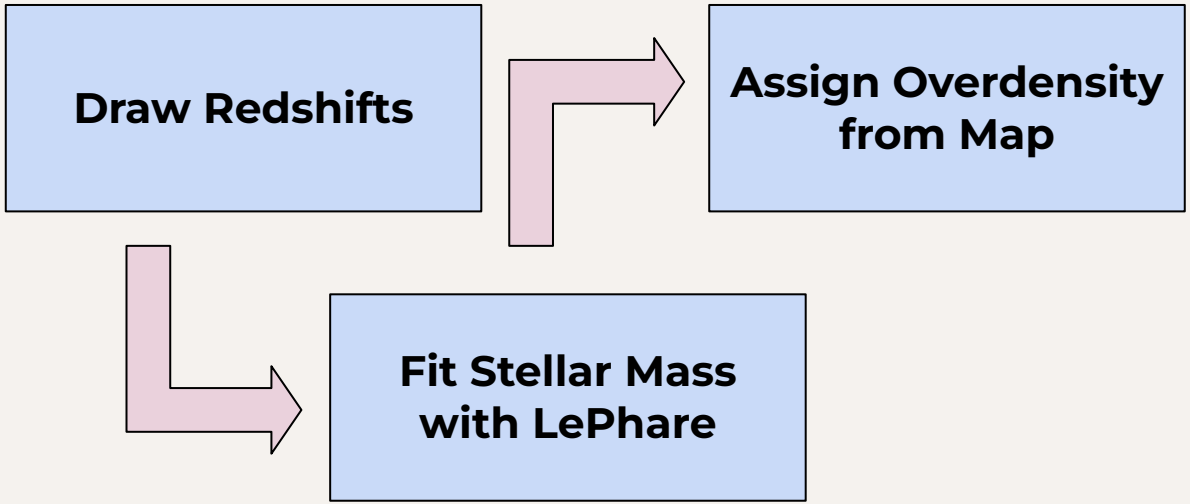

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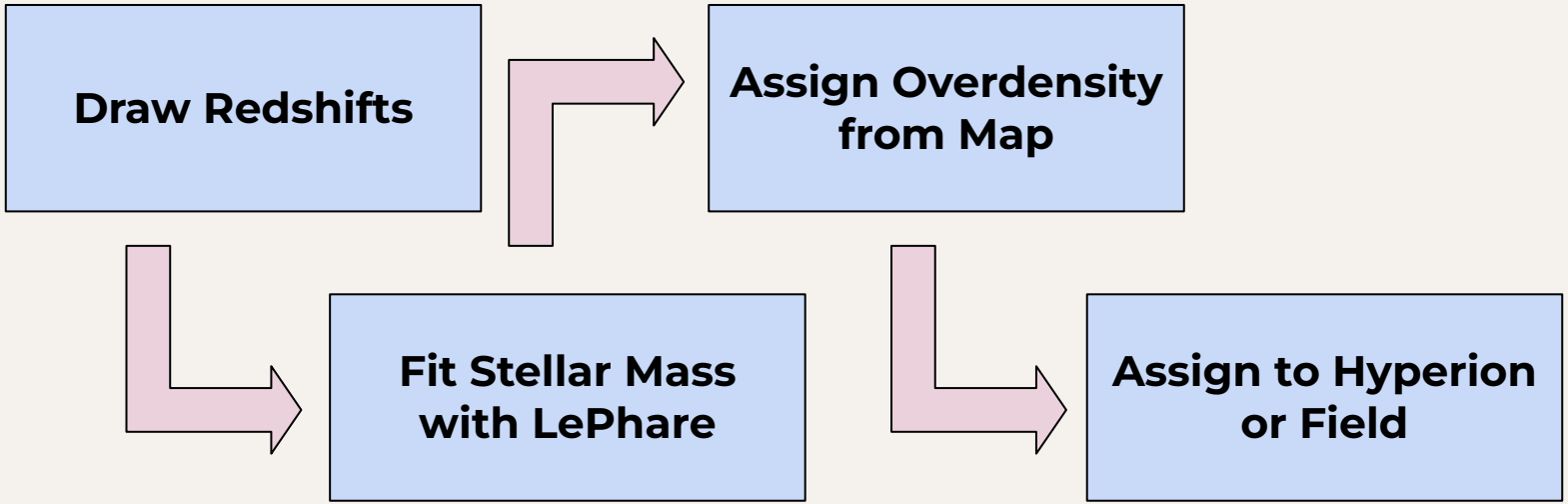

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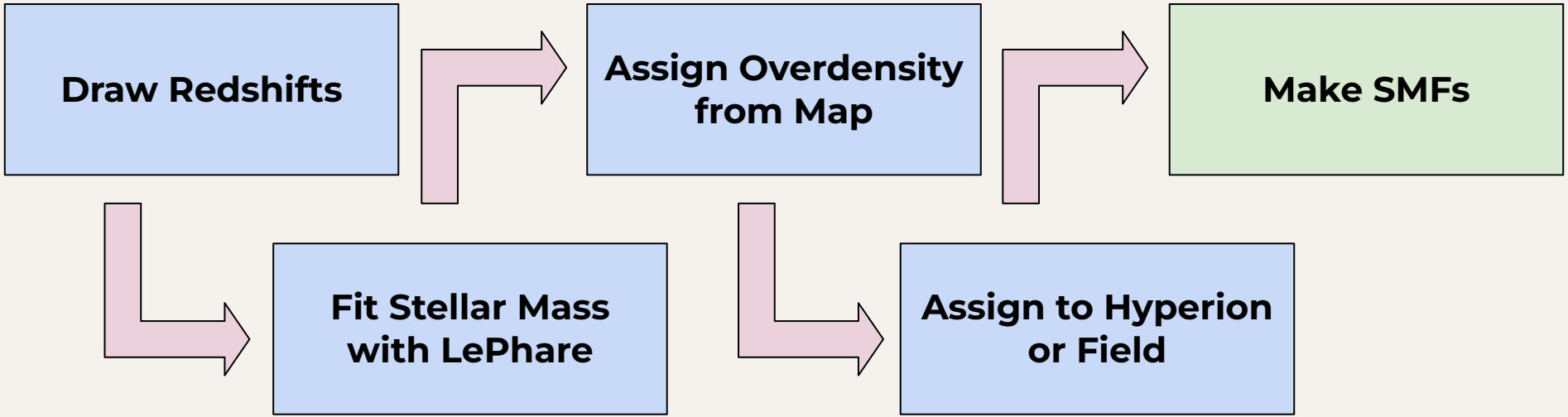

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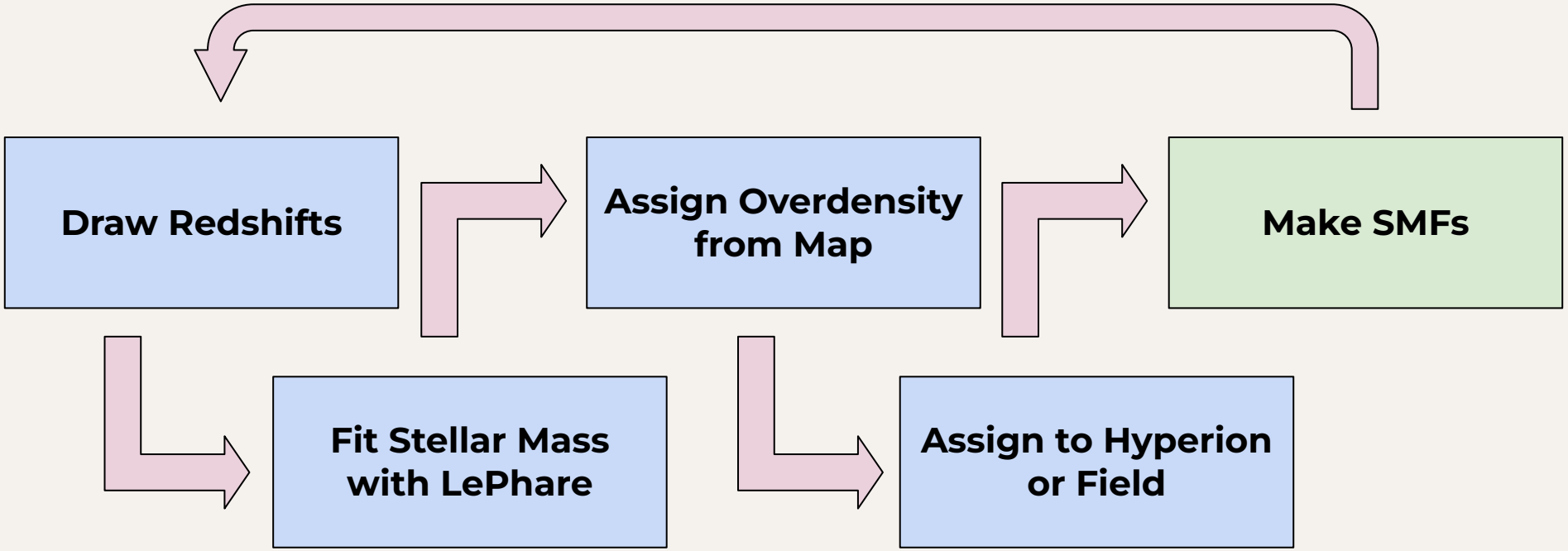
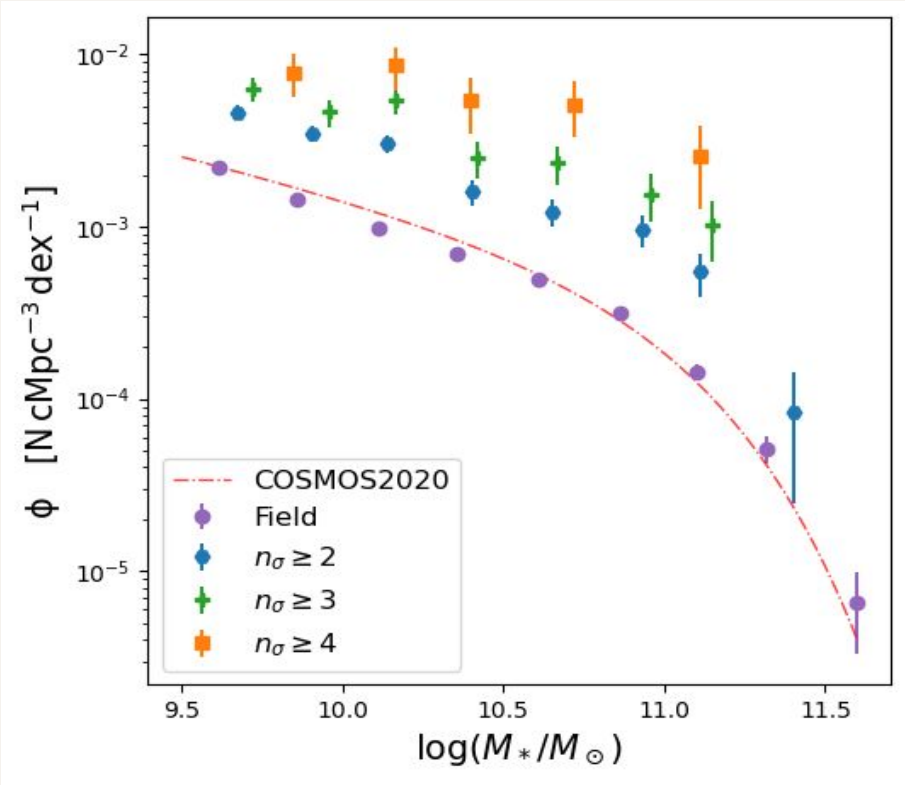
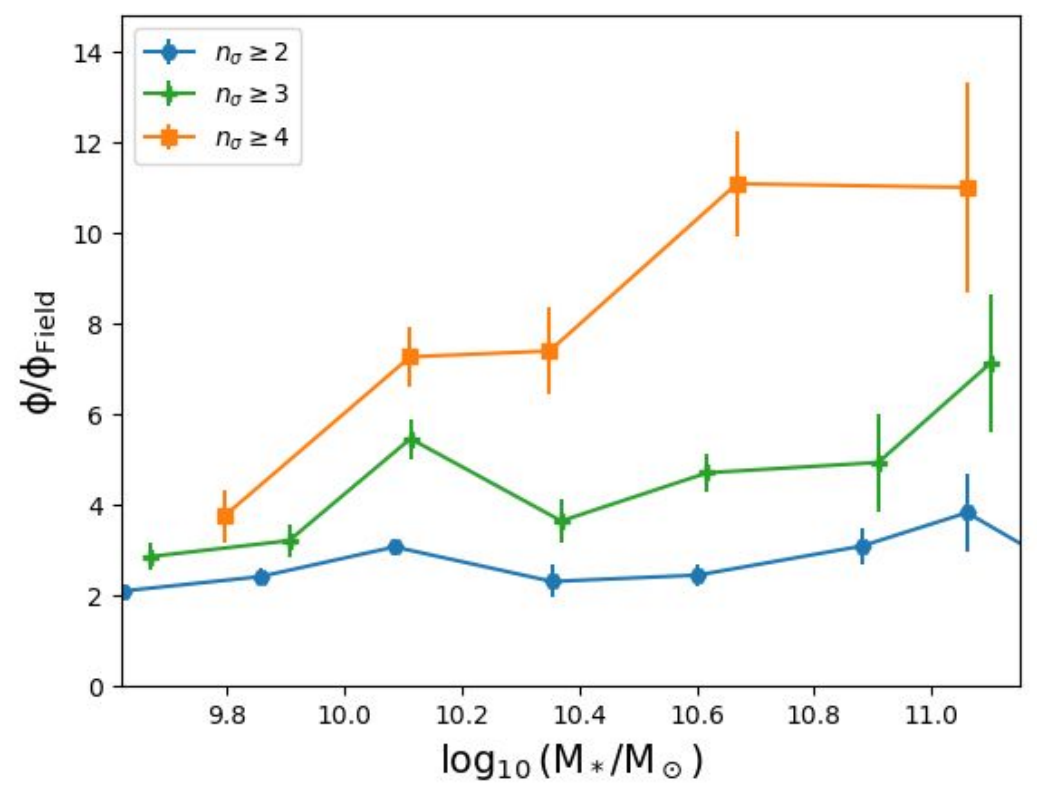


Stellar Mass Functions



- **Compare 5 SMFs:**
  - The combined field sample
  - Three different overdensity thresholds of Hyperion
  - The COSMOS2020 field for $2.0 \leq z \leq 2.5$ (Weaver et al., 2023)

Normalized SMFs



There is an abundance of massive galaxies in the most overdense regions

Could mean:

- Galaxies form at earlier epochs in these regions
- Galaxies experience enhanced SFRs in overdense regions
- Mergers are more frequent and driving up stellar mass (see talk by Finn Giddings).

Stellar Mass Functions