

WISH-Long (Wide-field Imaging Surveyor for High-redshift at Long wavelength)

超広視野赤外線撮像探査衛星

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LoI提出に至った経緯

～2006年 Hubble Origin Probe (HOP)用超広視野カメラ検討

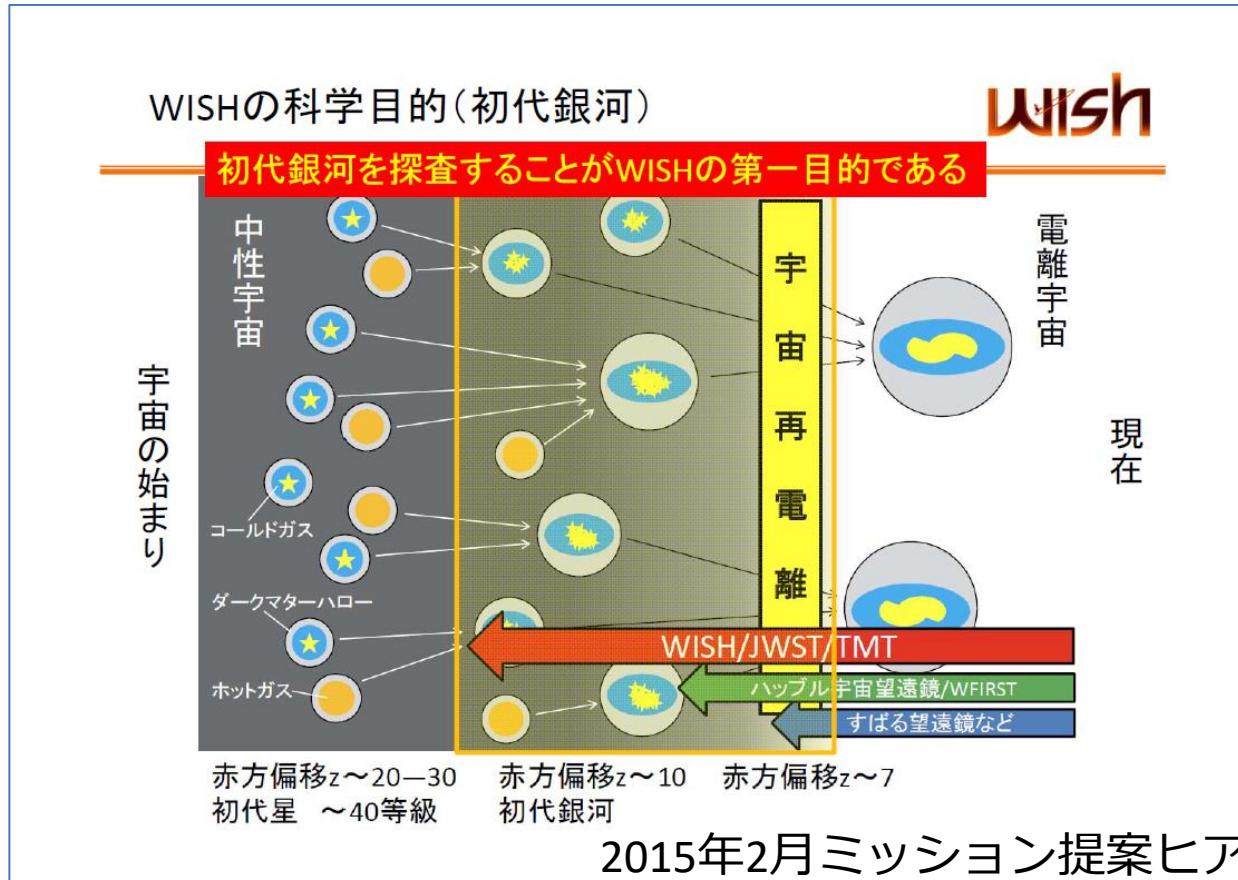
- 山田亨、岩田生ら
- すばるで大成功した広視野探査の自然な発展

2007年～ 超広視野近赤外線衛星検討

- 山田亨、岩田生ら
- 地上からは到達不可能な深さの広視野探査
- 2008年9月 宇宙理学委員会WG設立
- 2015年2月 光赤天連「工程表」
「ケース 2: 2020 年代初期に WISH を実現し、2030 年代に SPICA を実現」
- 同月 戦略的中型ミッション提案
- 2019年～ 再起動！
 - WFIRSTと波長で棲み分け
 - プロジェクト参加者大募集！！

Science goal

Unveiling the global history of galaxy formation and evolution from the earliest Universe to the present-day



To finish searching the first objects in the Universe

To complete the census

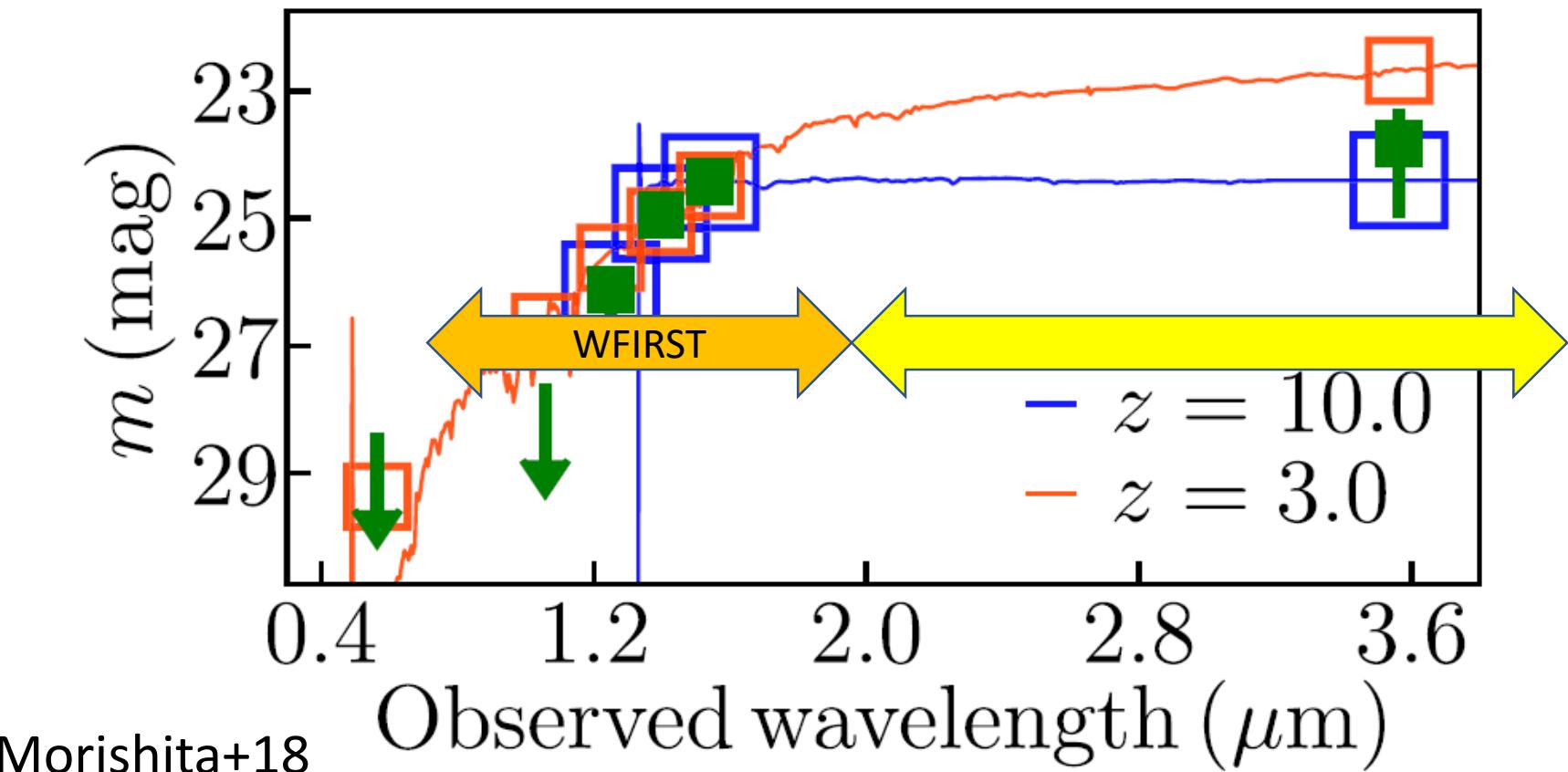
Wavelength: WISH-'Long' → 2-5μm



2015年2月ミッション提案ヒアリング資料

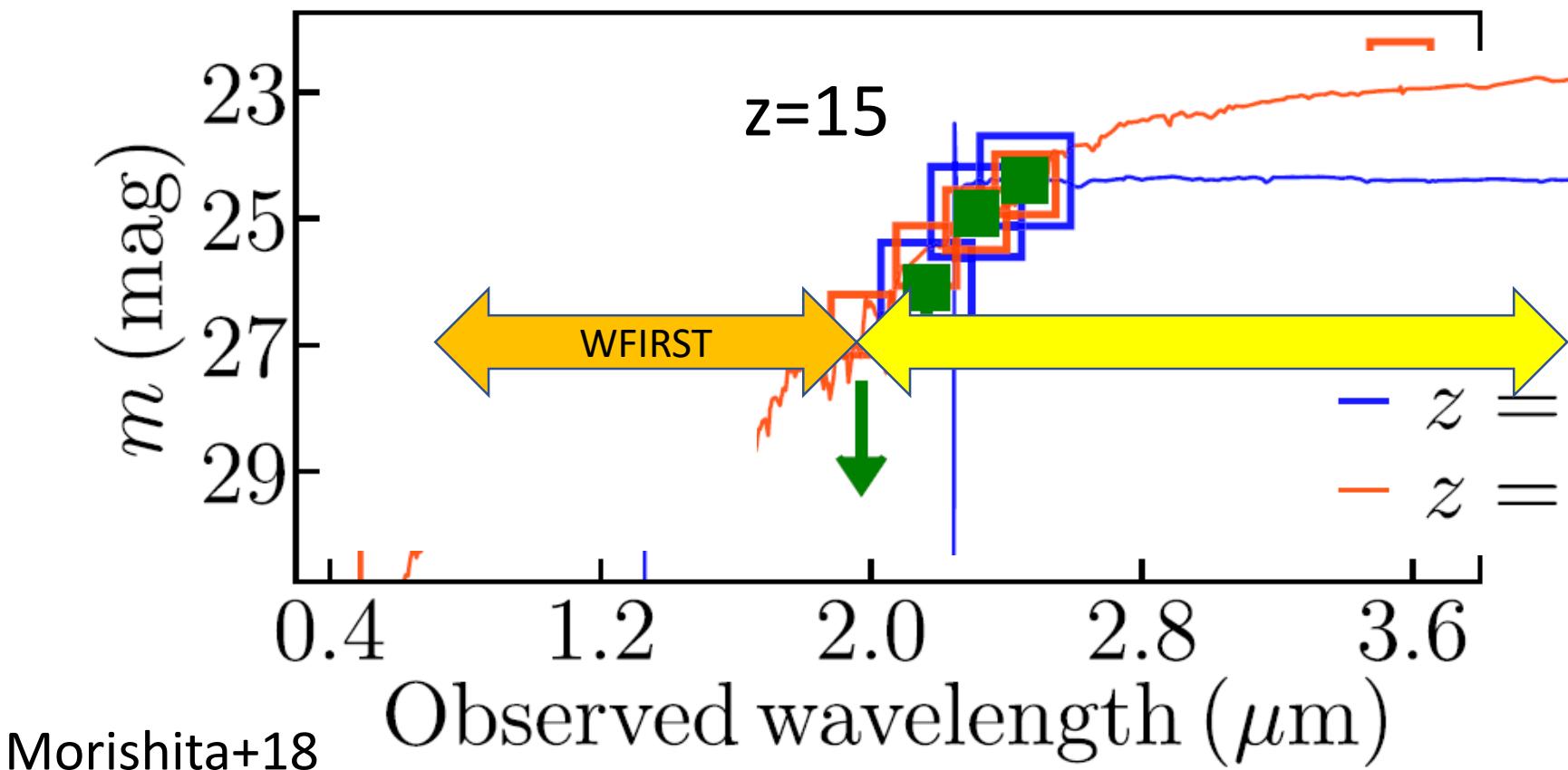
Wavelength coverage

- The $\lambda > 2\mu\text{m}$ coverage allows to select $z > 10$ galaxies securely with multiple bands.



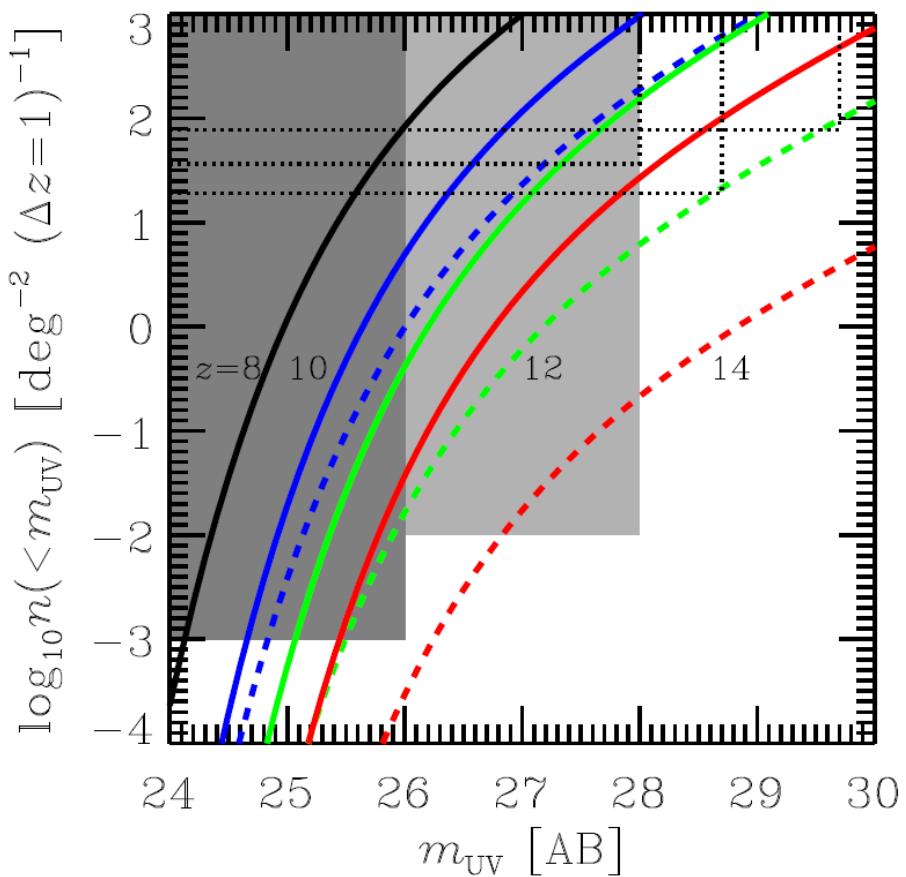
Wavelength coverage

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Wide-field

- A $>100 \text{ deg}^2$ survey is required to detect >10 galaxies at $z>14$, especially for spectroscopic follow-up targets.



JWST surveys: (10 σ , point)

JADES-D: 46 arcmin 2 , 29.7AB

JADES-M: 190 arcmin 2 , 28.7AB

CEERS: 100 arcmin 2 , 28AB

WISH-Long surveys:

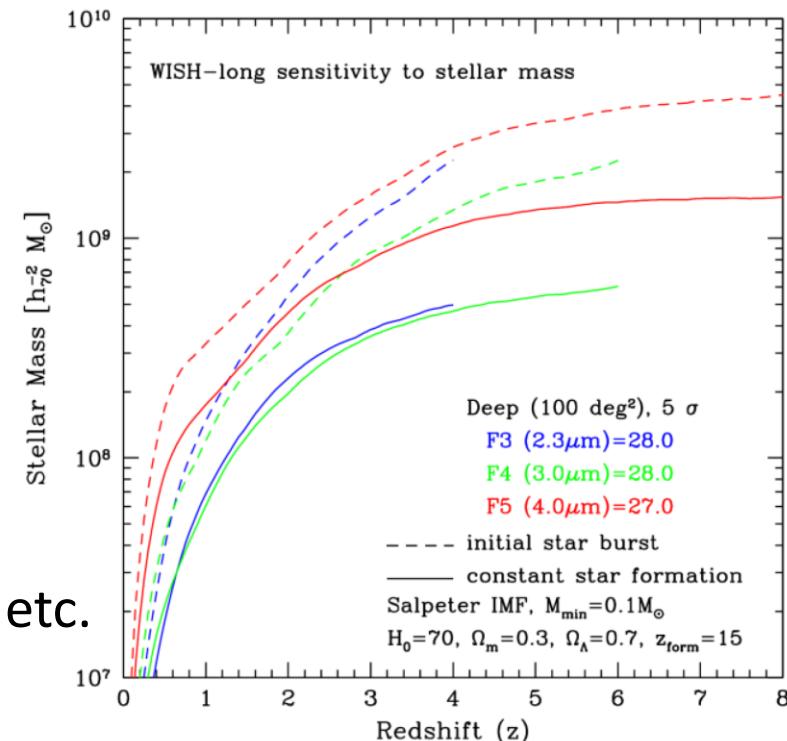
Deep Survey: 100 deg 2 , 28AB

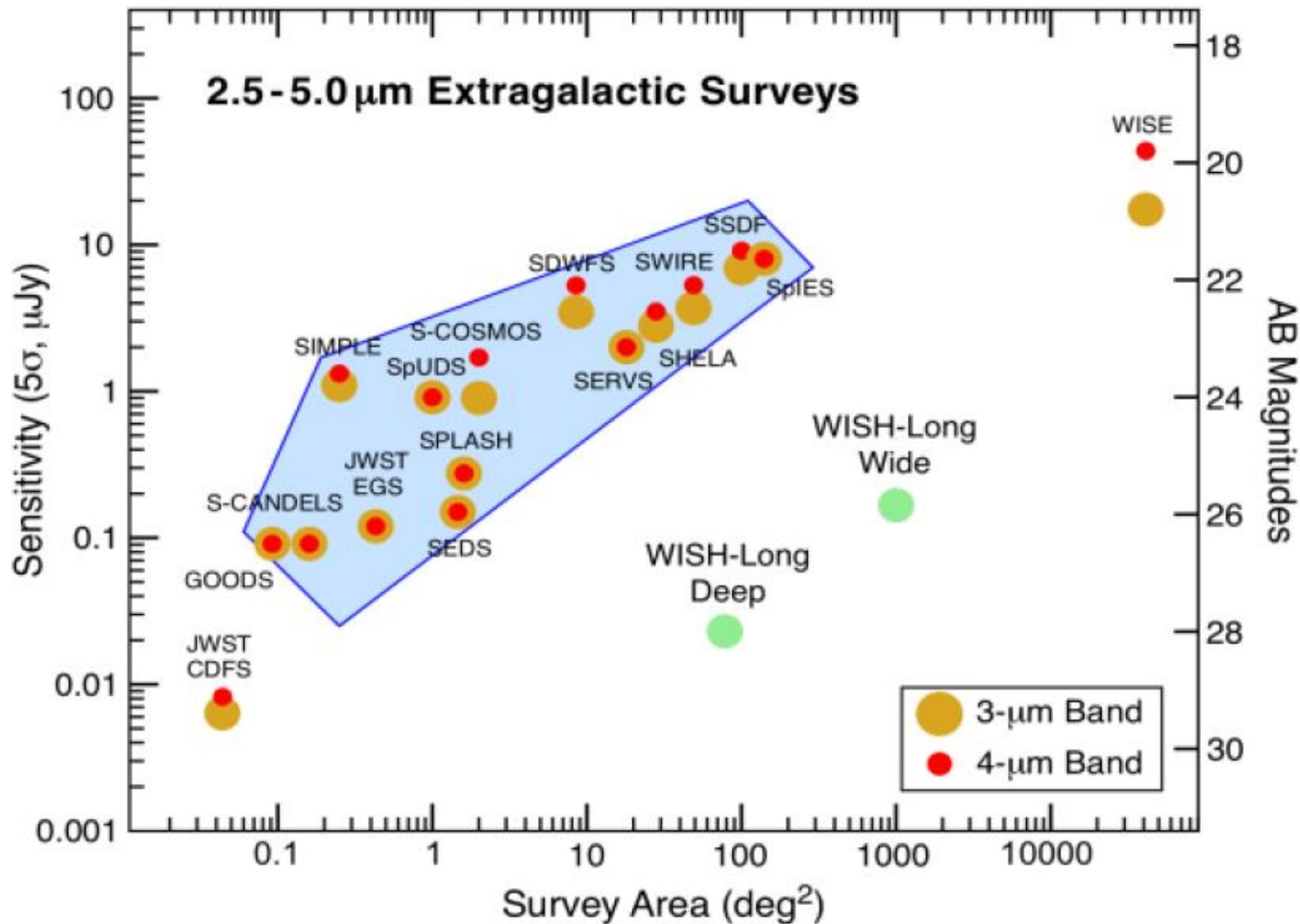
Wide Survey: 1e3 deg 2 , 26AB

$z>15$: 'WFIRST-drop' galaxies
 $\lambda(\text{Ly}\alpha)=1.95 \text{ micron}$ at $z=15$

Science objectives

- Detecting the first generation of galaxies at $z>12$.
- Surveying building blocks of galaxies down to 1% of the Milky Way in the stellar mass up to $z=8$.
- Tracking the formation and growth of large-scale structures.
- SN Ia cosmology at $z\sim 2$
- Water ice $3\mu\text{m}$ feature
- Low-Teff objects in the MW
- Exotic/unknown objects
 - SLSNe, high- z massive gals., floating planets, cold neutron stars, etc.

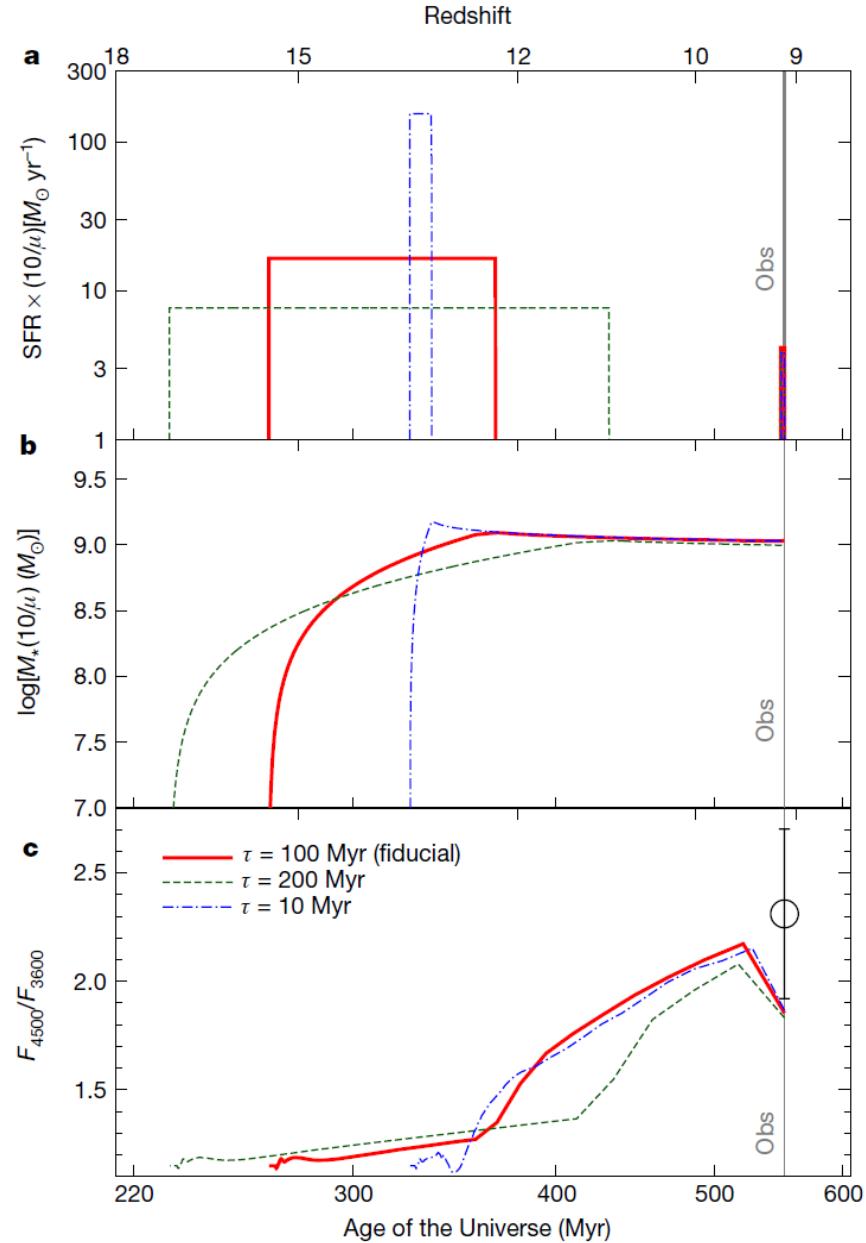
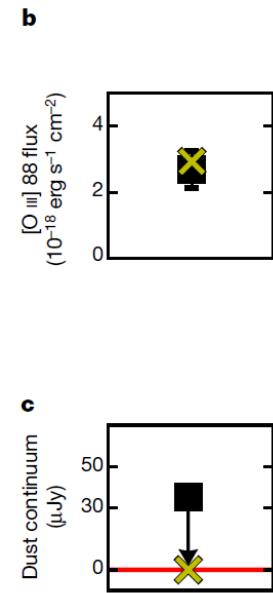
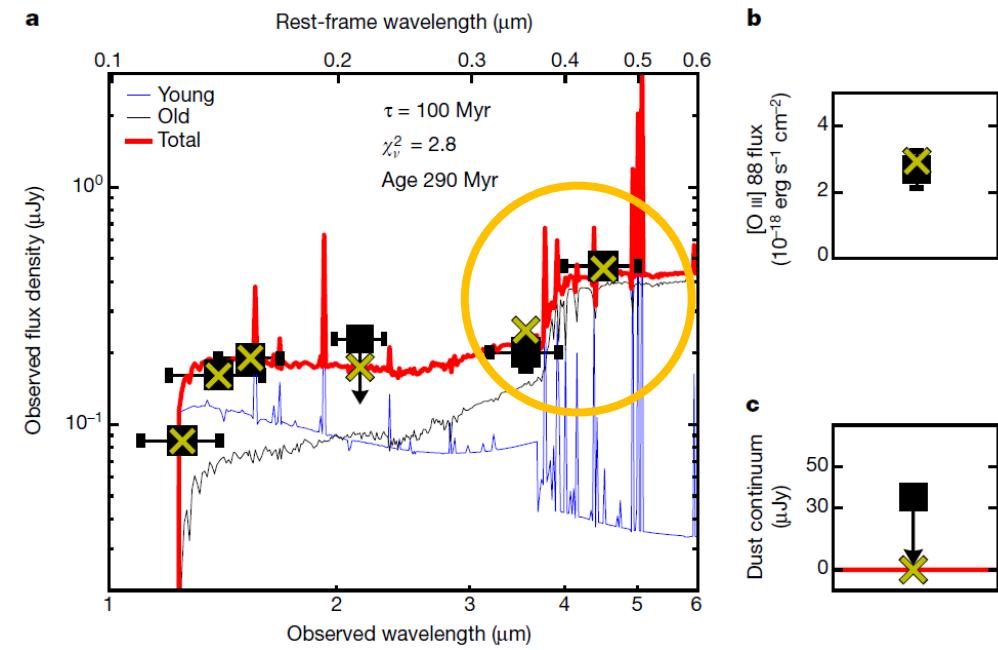




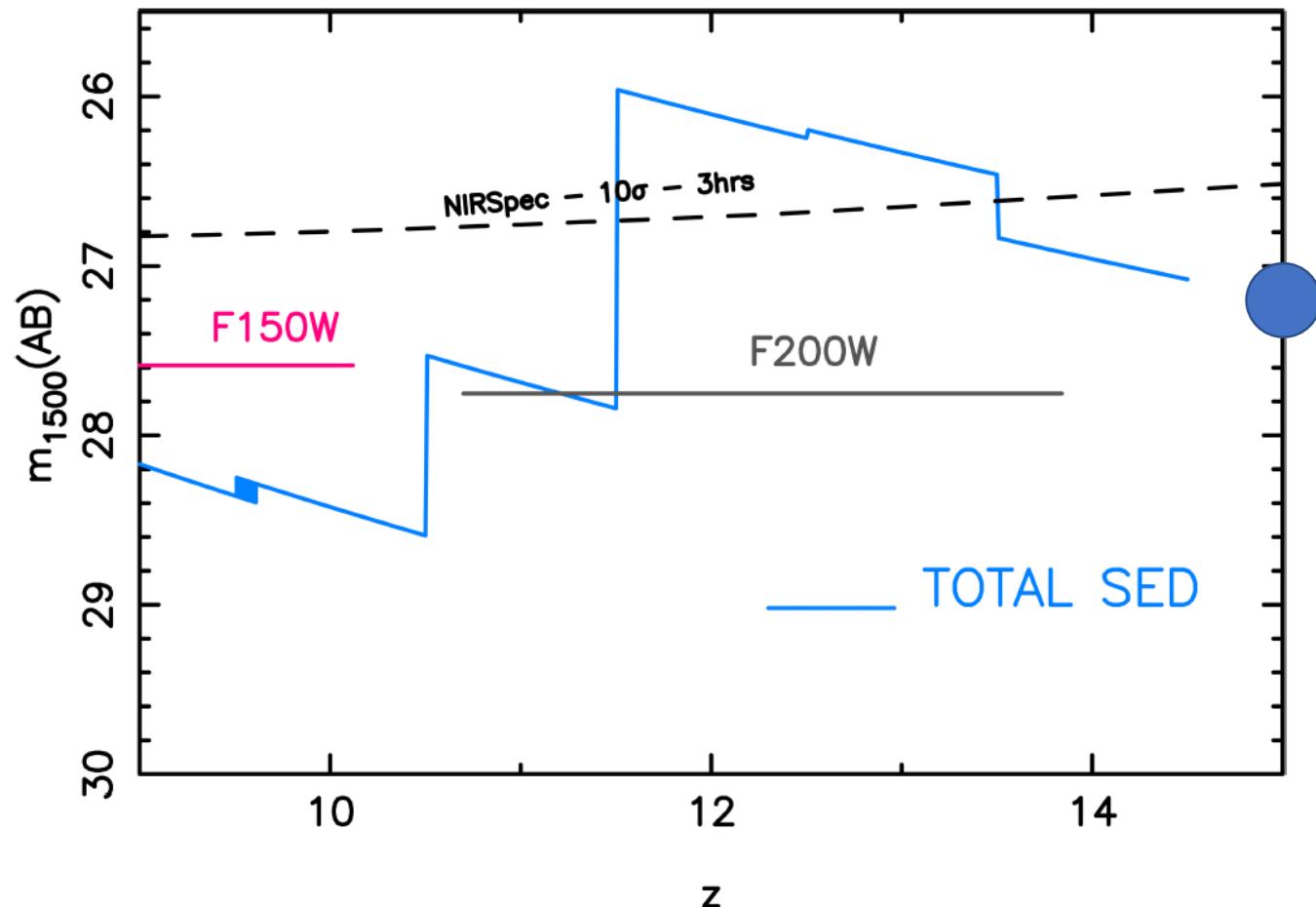
	WISH	JWST	Euclid	WFIRST	SPICA
Launch	~2030	2021	2022	2026	2028
Aperture (m)	1.5	6.5	1.2	2.4	2.5
Wavelength (micron)	2--5	0.6--28	0.6--2	0.5--2	12--230
Field-of-view (arcmin²)	~1000	9.7, 2.4	1900	1000	4--120

MACS1149-JD1

- Balmer break !
 - ~300 Myr old stellar age
 - Formation at $z \sim 15$!
 - “WFIRST drop”!!



MACS1149-JD1 progenitor at z~15



銀河研究のフロンティア

- 最高赤方偏移
- 限界等級
- 空間分解能