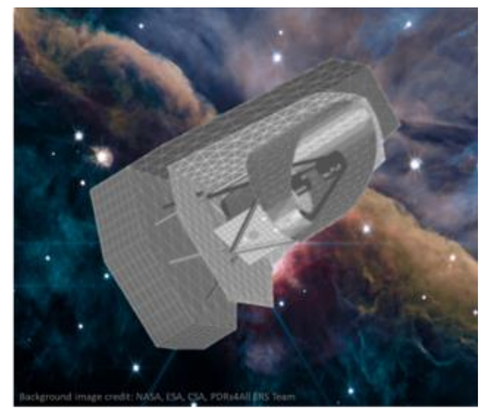
A candidate of the 2030s' strategic L-class mission by ISAS/JAXA:

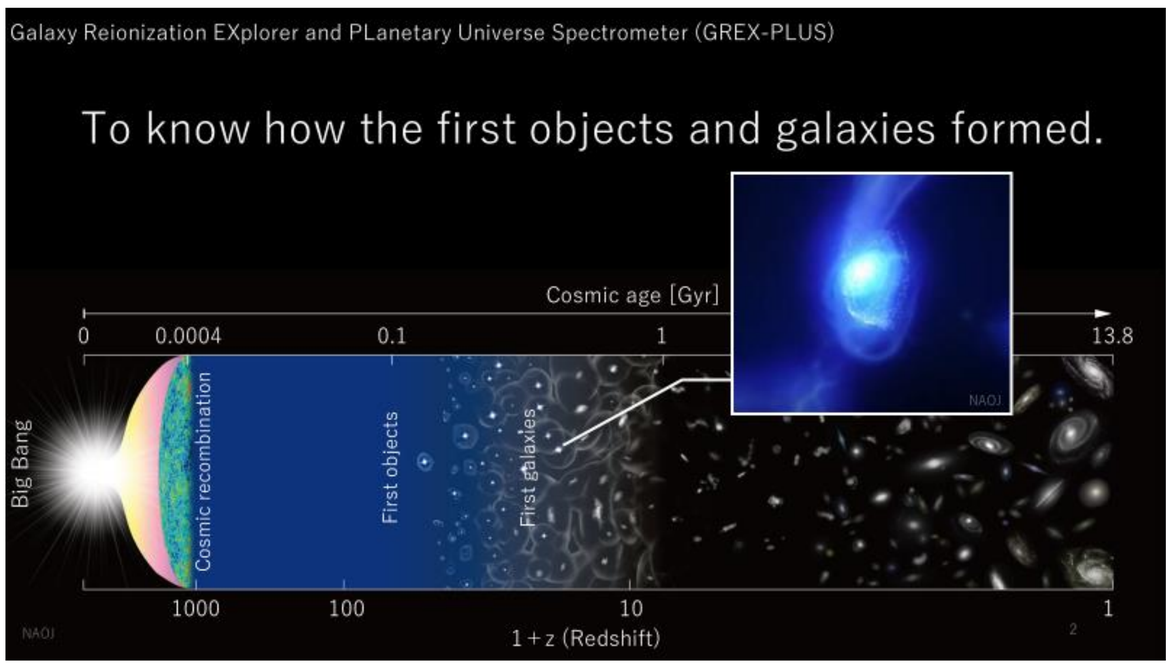
GREX-PLUS

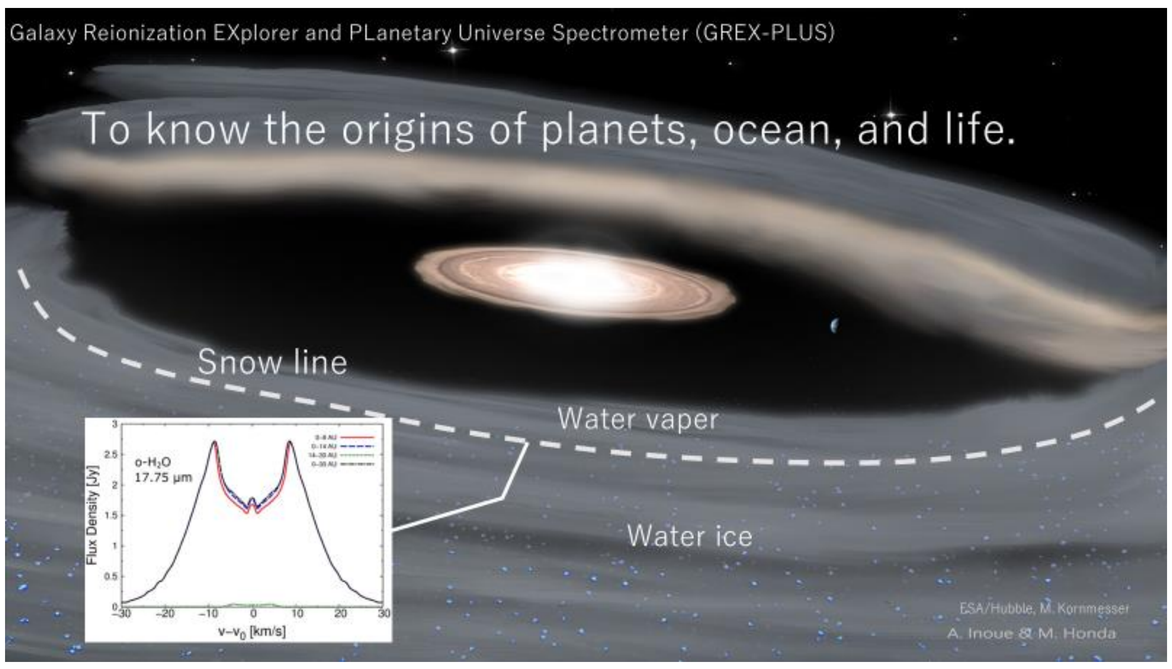
Galaxy Reionization EXplorer and PLanetary Universe Spectrometer

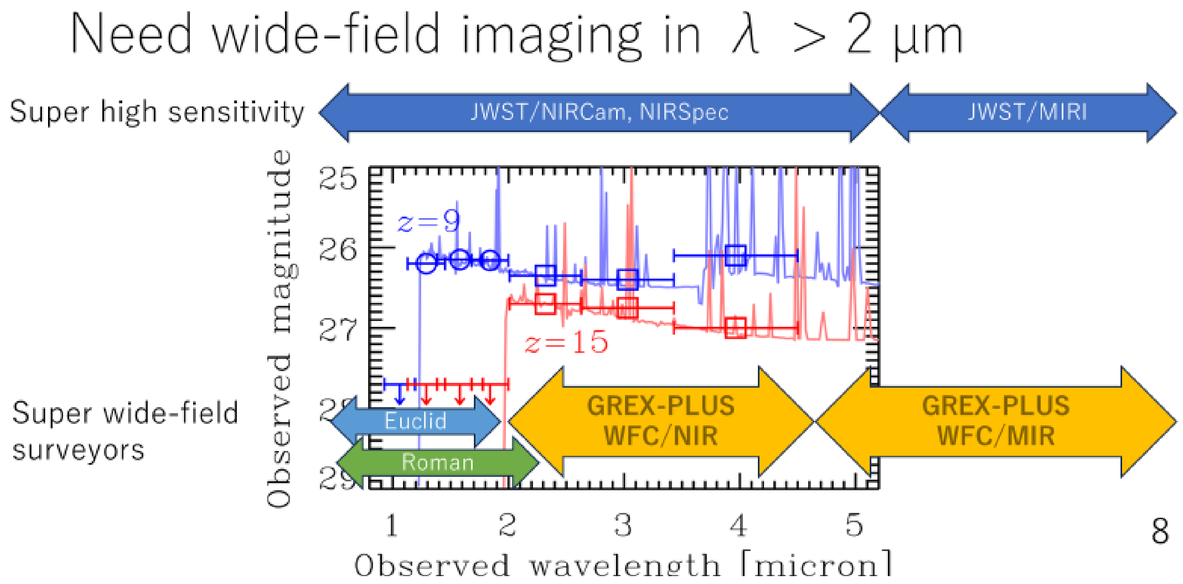


Akio K. INOUE (Waseda U.) et al.

GREX-PLUS Science Book: arXiv:2304.08104

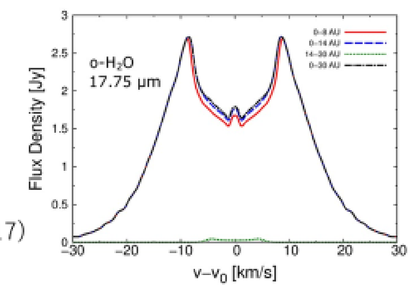




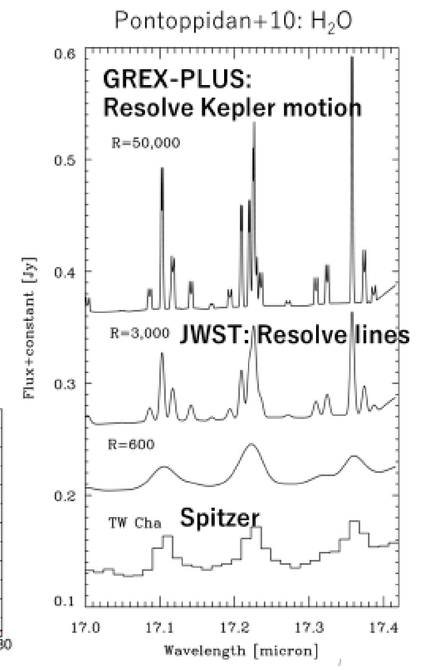


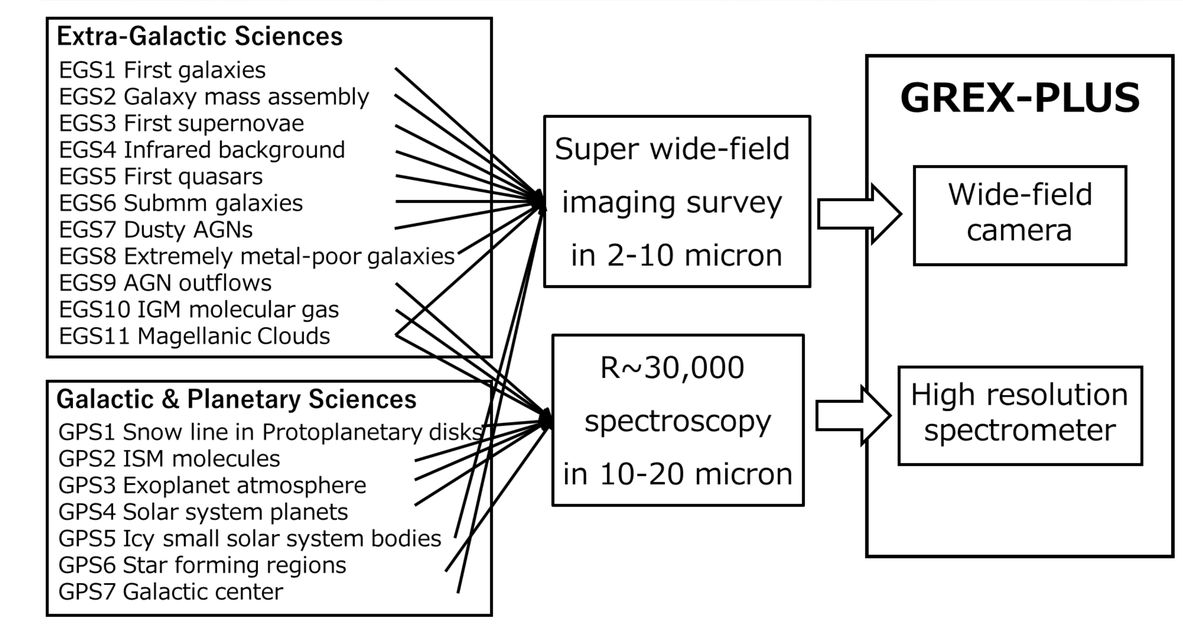
Need high spec. resolution

- To resolve water snowline spatially is too difficult.
- Let's resolve the position in velocity.
  - Kepler motion is ~30 km/s
  - Need ΔV~10 km/s → R=30,000!
  x10 higher velocity resolution than JWST
  - JWST R~3,000
    ΔV~100 km/s

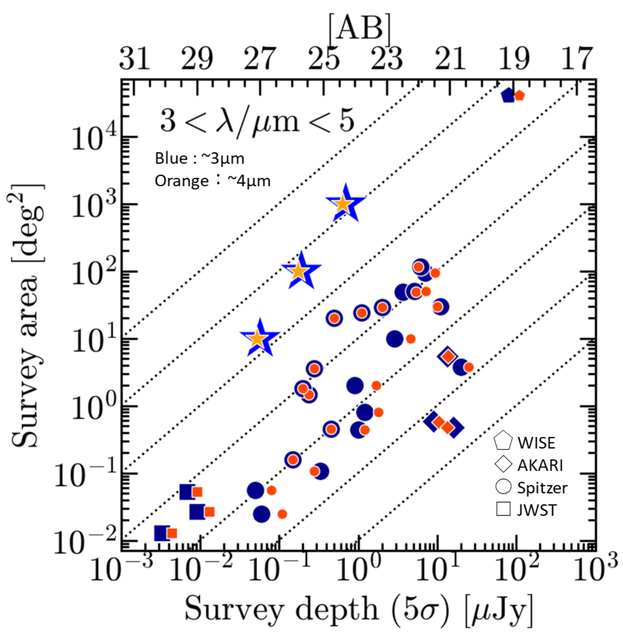


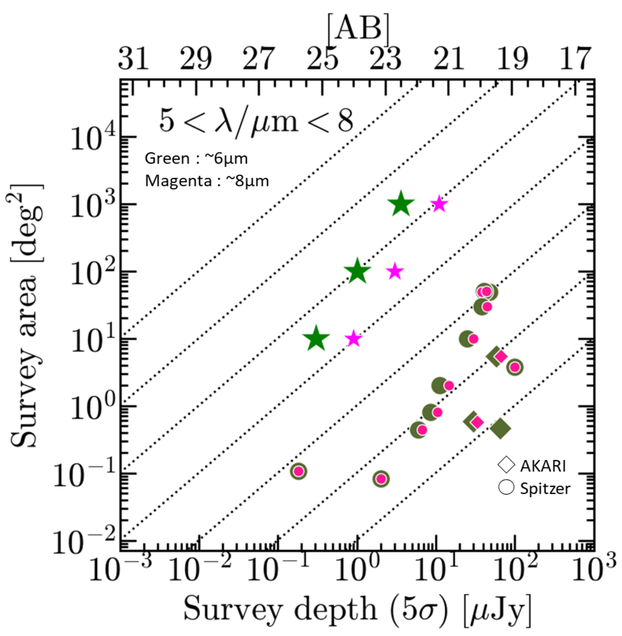
Notsu et al. (2017)





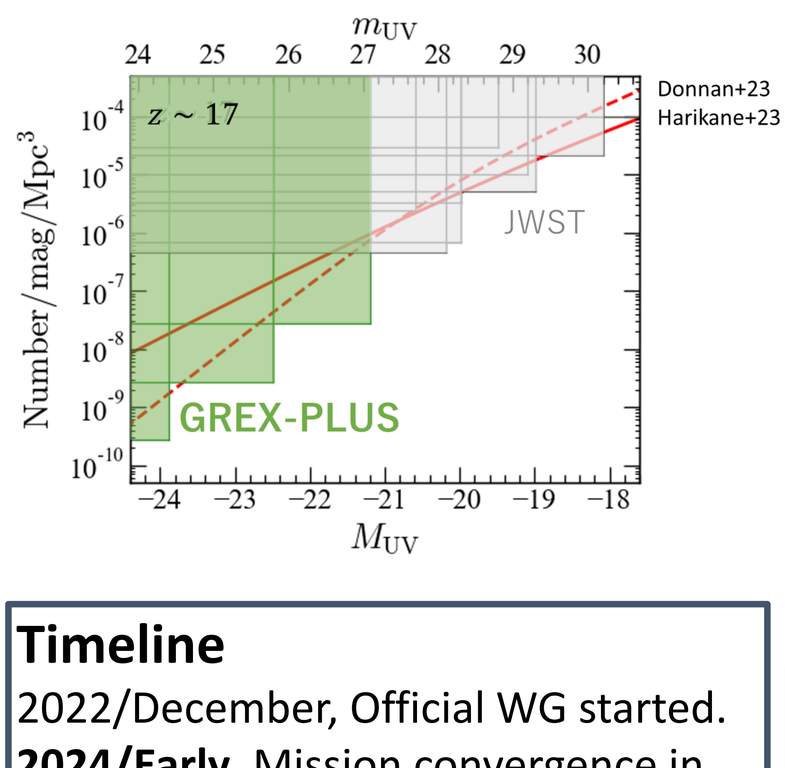
GREX-PLUS WFC Survey Parameters



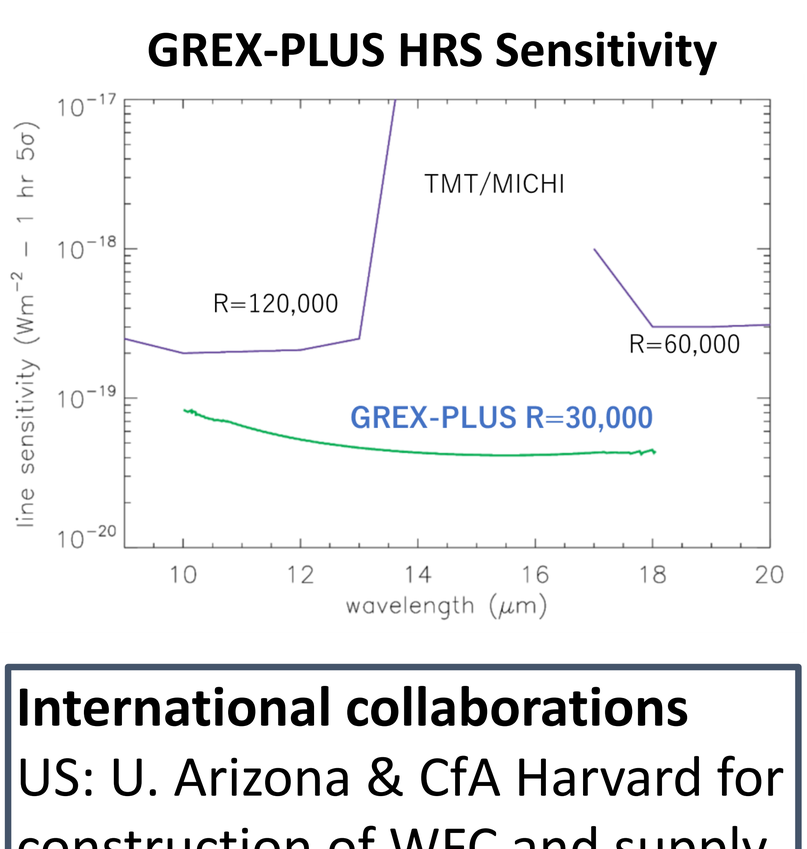


Baseline specifications

- Cryogenic space telescope (**<50K**)
  - Primary mirror diameter: **1.2m**
  - Detector temperature: 7-50 K
  - Cooling system from SPICA
- **Wide-Field Camera**
  - Field-of-view：**1,260 arcmin2**
  - 7 HgCdTe detectors
  - Division into 5 bands
    - 3 bands in 2-5 micron
    - 2 bands in 5-8 micron
    - No filter exchange system
- **High Resolution Spectrometer**
  - **R=30,000** (Δv=10 km/s) in 10-18 micron
  - CdZnTe Immersion Grating
- Nominal lifetime: 5 years + 2+ years (goal)
- Cost: <40B JPY
- ISAS/JAXA Strategic L-class
- Launch: **mid-2030s**



GREX-PLUS HRS Sensitivity



Timeline

2022/December, Official WG started.
2024/Early, Mission convergence in Astrophysics Division/ISAS
2024/November, Mission adoption
2025, MDR?
2033/34, Launch?

International collaborations

US: U. Arizona & CfA Harvard for construction of WFC and supply of HRS detector
How about EU?