HSC/SCUBA-2/ALMA surveys for high-z galaxies

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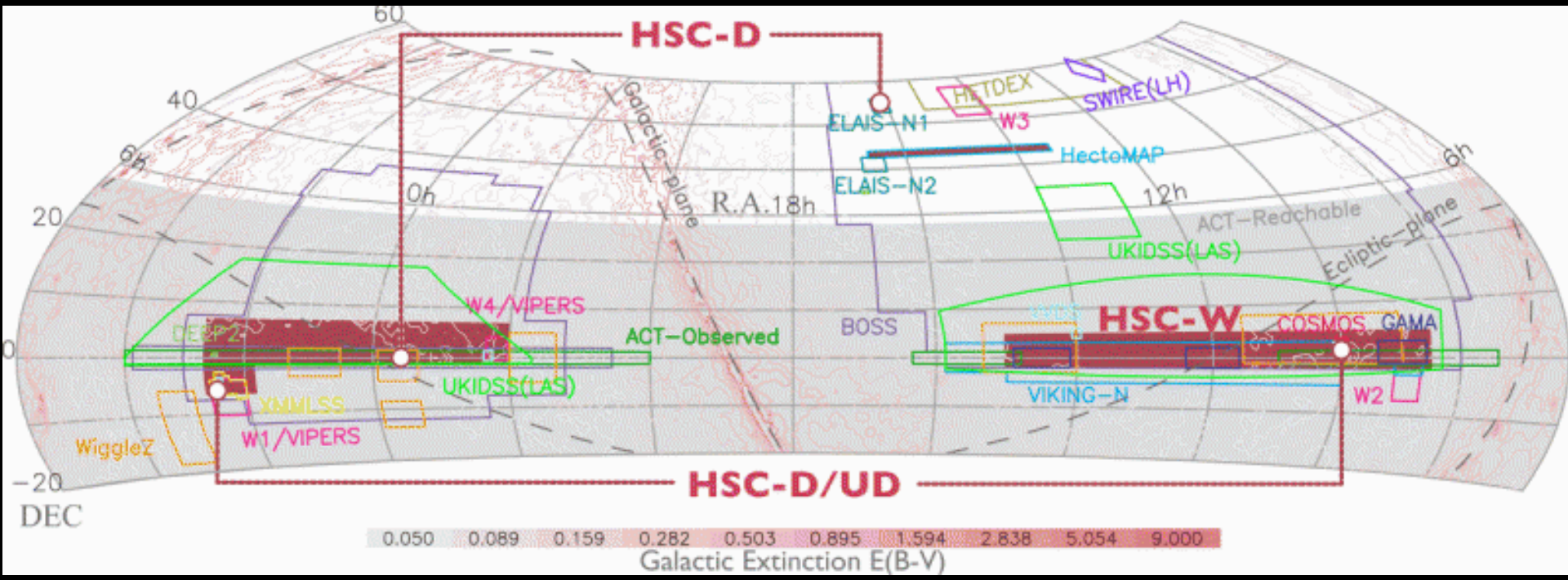
Subaru/HSC SSP survey (2014-2019)

(Takada, Tanaka & Sawicki's talks)

- http://hsc.mtk.nao.ac.jp/ssp/
- The survey started in March 2014 and spend 300 nights over 5-6 years with *grizy*+4NBs



HSC SSP papers (high-z galaxies)

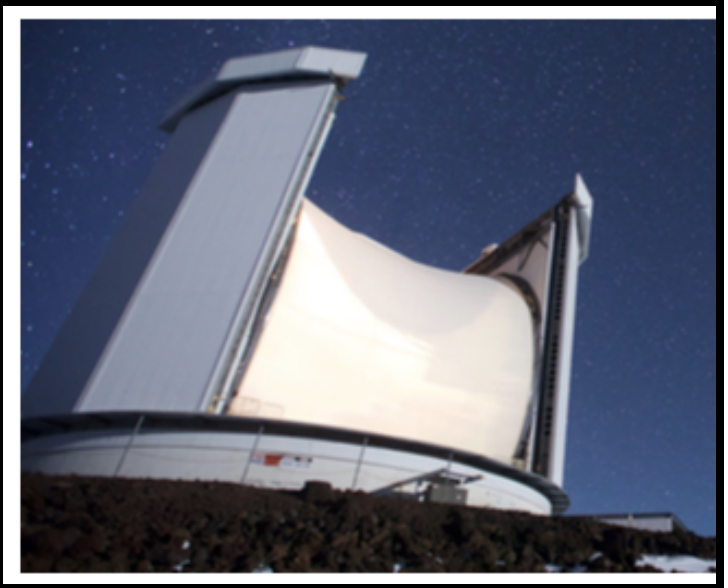
Cosmic reionization and Structure Formation

- **z=4 Protoclusters:** Systematic Protocluster Search at z~4 based on the HSC Subaru Strategic Program (Toshikawa+)
- **z=4-6 LBGs:** Great Optically Luminous Dropout Research Using Subaru HSC (GOLDRUSH). I, II (Ono+, Harikane+)
- **z=6-7 LAEs:** Systematic Identification of LAEs for Visible Exploration and Reionization Research Using Subaru HSC (SILVERRUSH). I, II, III, IV (Ouchi+, Shibuya+, Konno+)

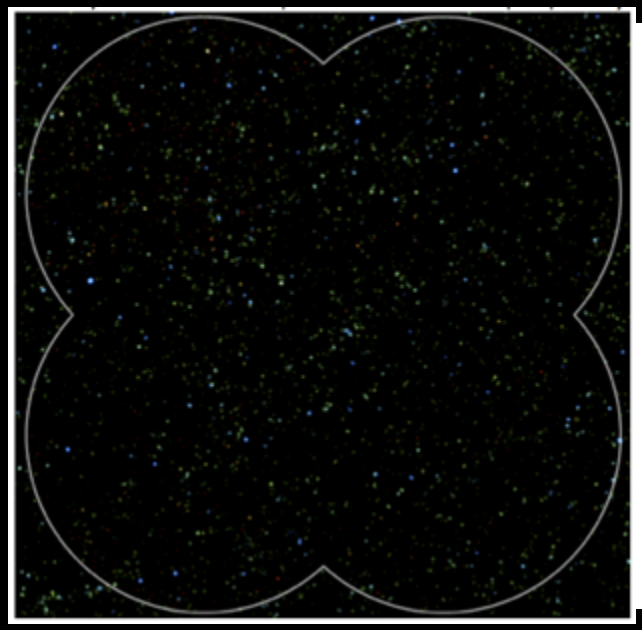
EAO/JCMT surveys (2015-2018)

- SCUBA2 surveys in one of the HSC UD field (COSMOS)
- ✓ S2COSMOS (Smail+) 223hours 2deg^2 rms$_{850um}$=1.2mJy
- ✓ STUDIES (Wang+) 340hours 7arcmin^2 rms$_{450um}$=0.85mJy

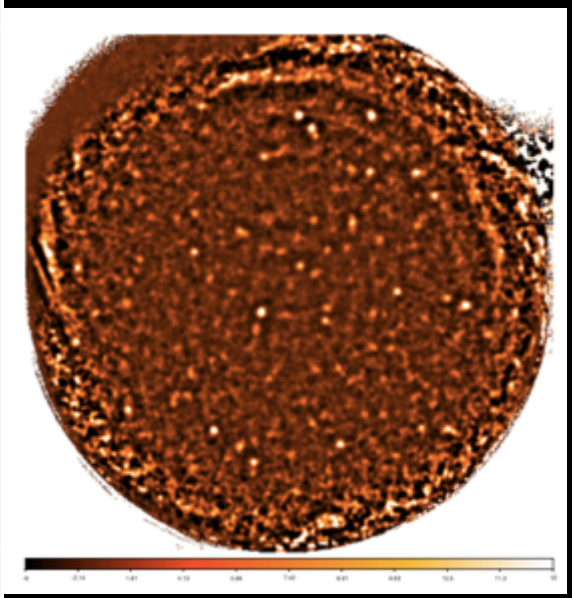
JCMT



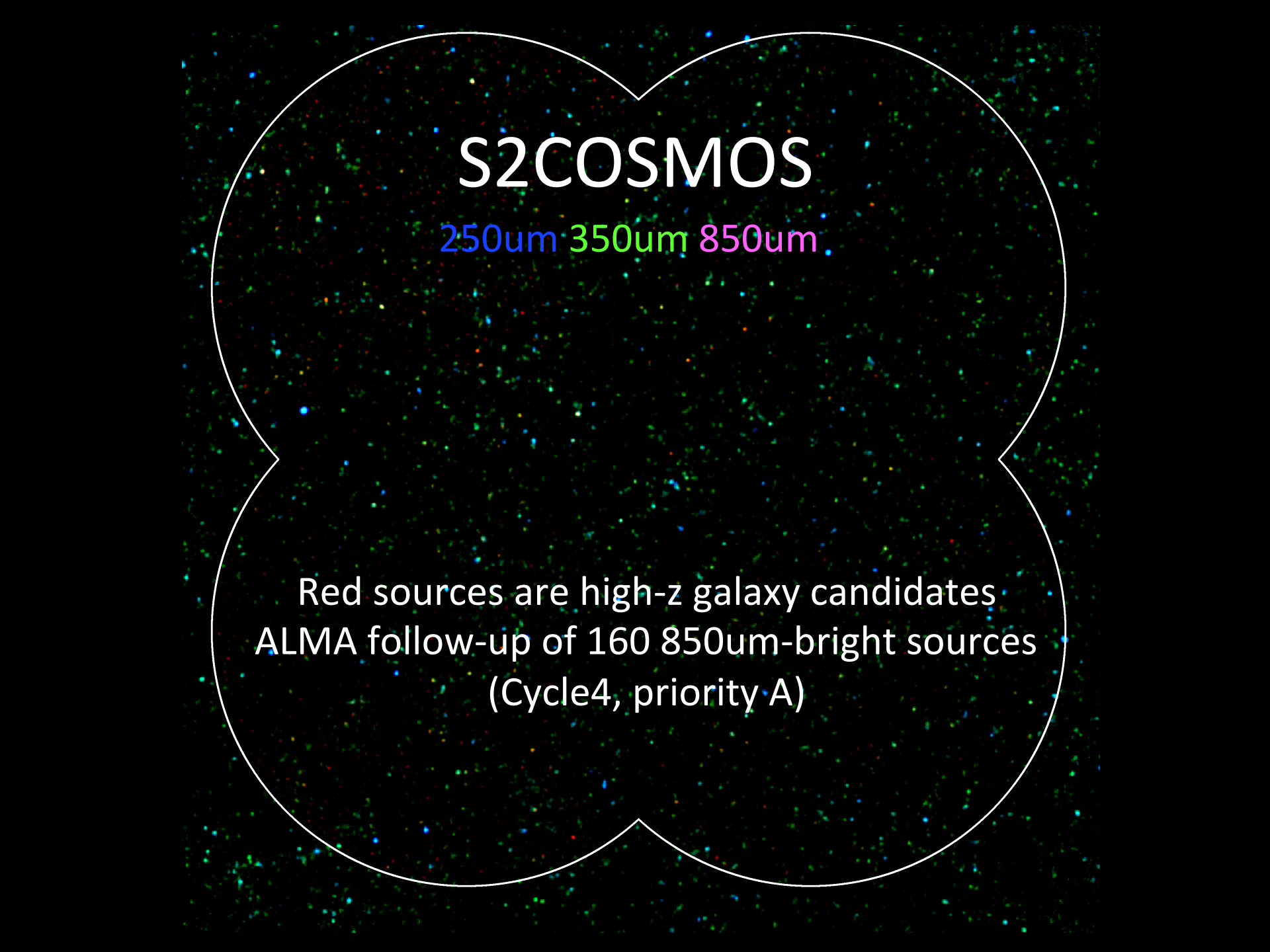
S2COSMOS



STUDIES

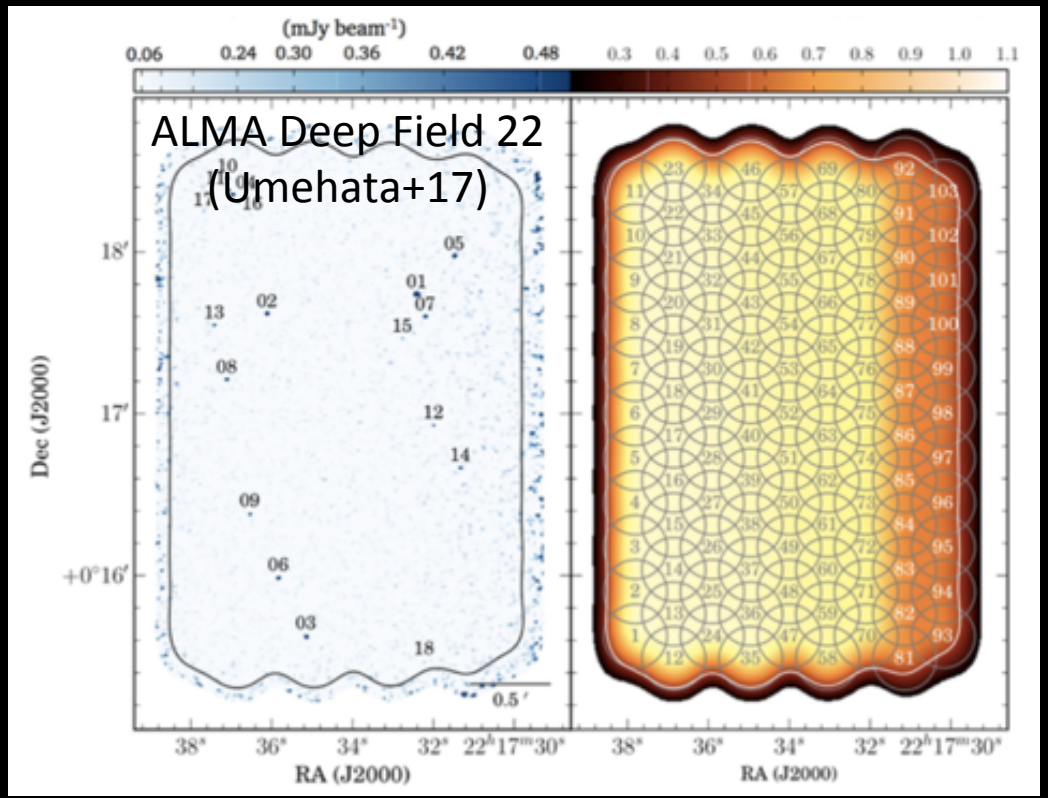


https://www.eaobservatory.org/jcmt/wp-content/uploads/sites/2/2015/02/EAO-NEWS-2.pdf


S2COSMOS
250um 350um 850um
Red sources are high-z galaxy candidates
ALMA follow-up of 160 850um-bright sources
(Cycle4, priority A)

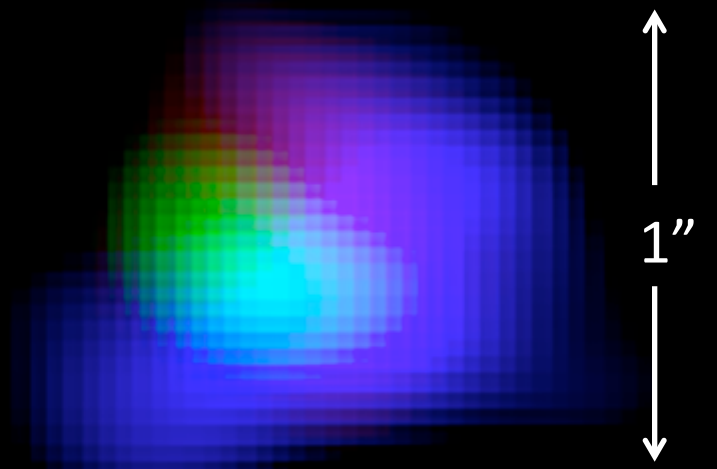
ALMA surveys

- ~500 SMG identifications in SXDS, SSA22, COSMOS (Hatsukade+, Ikarashi+, Umehata+, Matsuda+)
- ALMA Deep Fields in SXDS, SSA22, GOODS-S (Kohno+, Tadaki+, Hatsukade+, Umehata+)
- Fine Structure Line ([OIII]88, [CII]158, [NII]205) from SMGs, LAEs, LBGs, LABs (Nagao+, Ouchi+, Ota+, Matsuda+, Inoue+, Hayatsu+, Tamura+)



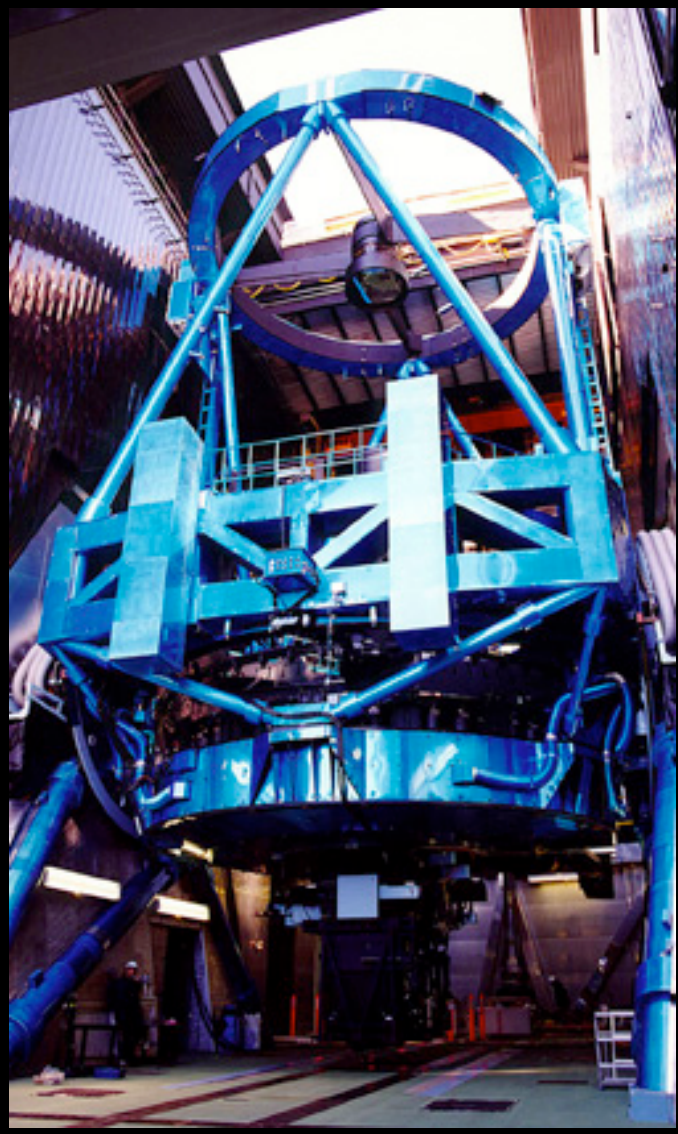
[OIII]88um from z=7.2 (Inoue+16)

Lya(Subaru) Star(UKIRT) [OIII]88(ALMA)



Long−term (>20yrs) Collaboration?

A z=7.2 galaxy (Inoue+16)



- **Can we launch Subaru into space under the international partnership (~$10B)?**
- Capability: Subaru Space Telescope achieves a 0.03” angular resolution at 1micron (0.01” at 4000A).
- Feasible? This is similar to LUVOIR (one of the four NASA Next Flagship Space Telescope mission concepts).

Summary

- HSC SSP survey has a good synergy with JCMT/ALMA surveys

- (I hope) the Subaru international partnership continues for >20yrs to launch Subaru into space