

STUDIES

SCUBA-2 Ultra Deep Imaging EAO Survey

Wei-Hao Wang (王為豪, ASIAA)
and STUDIES Team



Outline

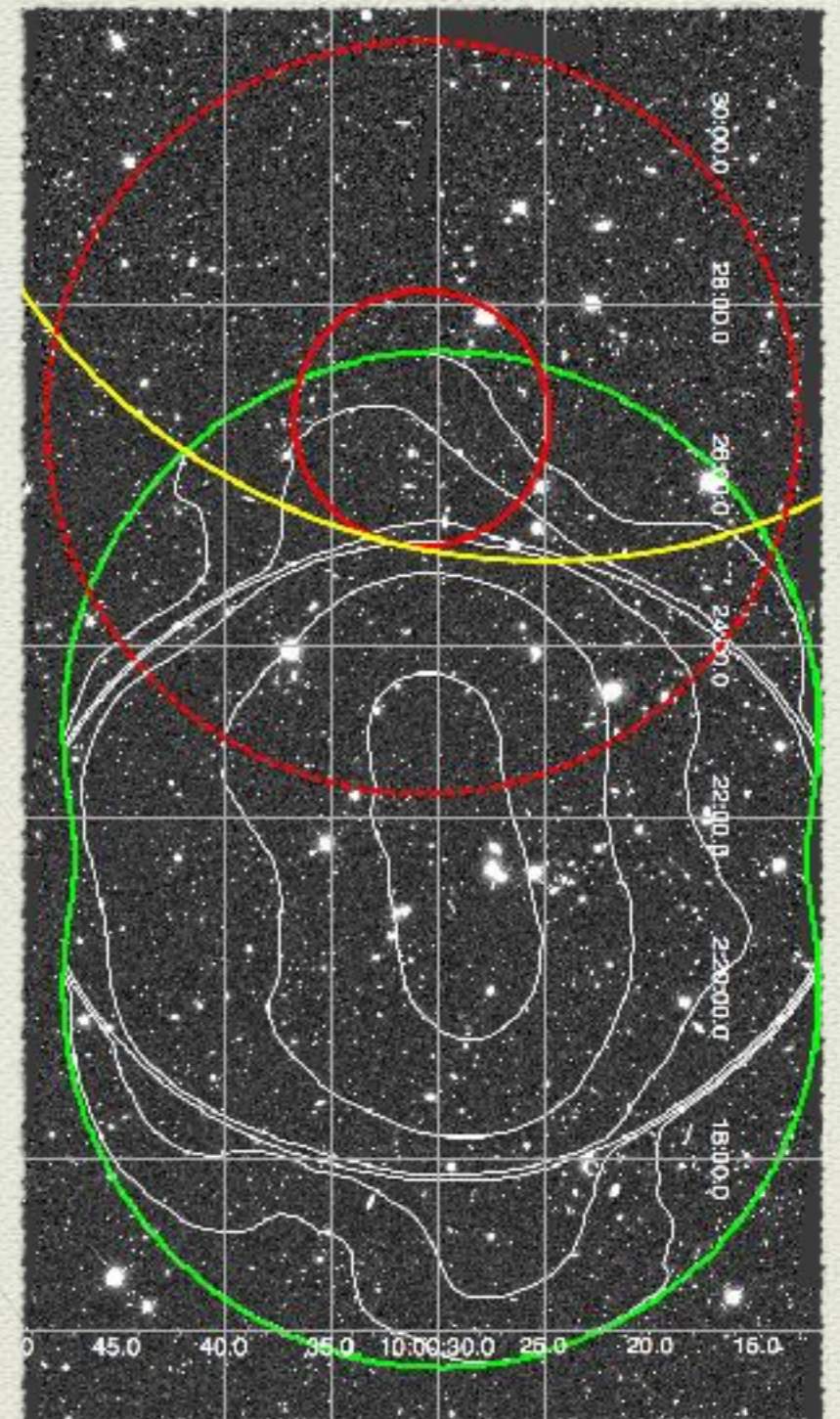
- ◆ Survey description
- ◆ Scientific goals
- ◆ Progress
- ◆ Preliminary results

STUDIES in a nutshell

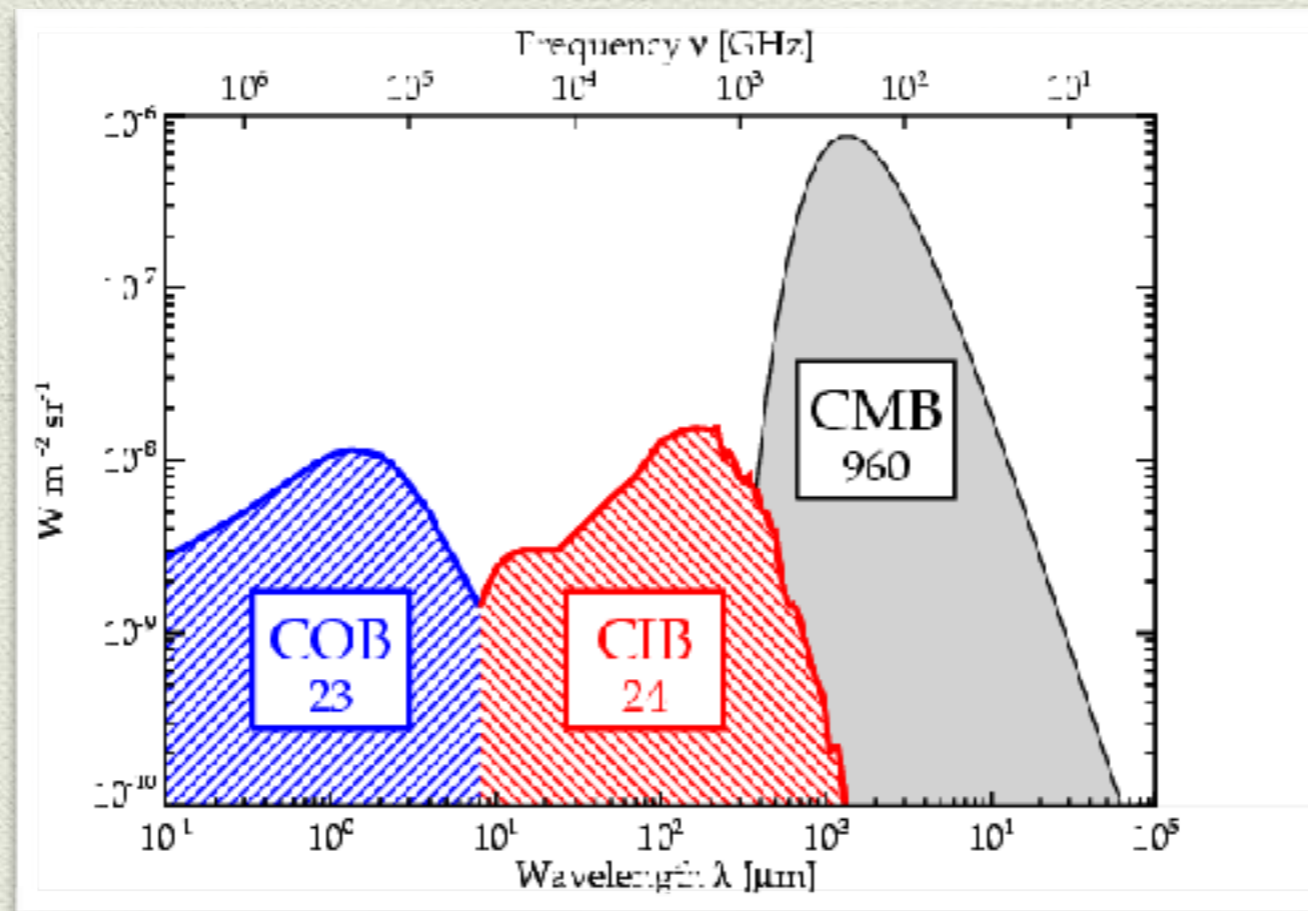
- ◆ One of the seven EAO JCMT Large Programs.
- ◆ A confusion limited SCUBA-2 450 μm map, deepest ever far-IR sensitivity limit.

Survey Description

- ◆ Pointing center: 10:00:30.7, +02:26:40.0
(center of COSMOS, norther edge of the CANDELS region)
- ◆ 330 hr of observations under the best submillimeter weather of Maunakea.
- ◆ single Daisy pointing ($D = 3'$ ultradeep core, $D = 10'$ deep outer region)
- ◆ $\sigma_{450\mu\text{m}} < 0.6$ mJy in the ultradeep core, $\sigma_{450\mu\text{m}} \approx 1$ mJy full map.
- ◆ Execution period: 2015–2019



Scientific Background

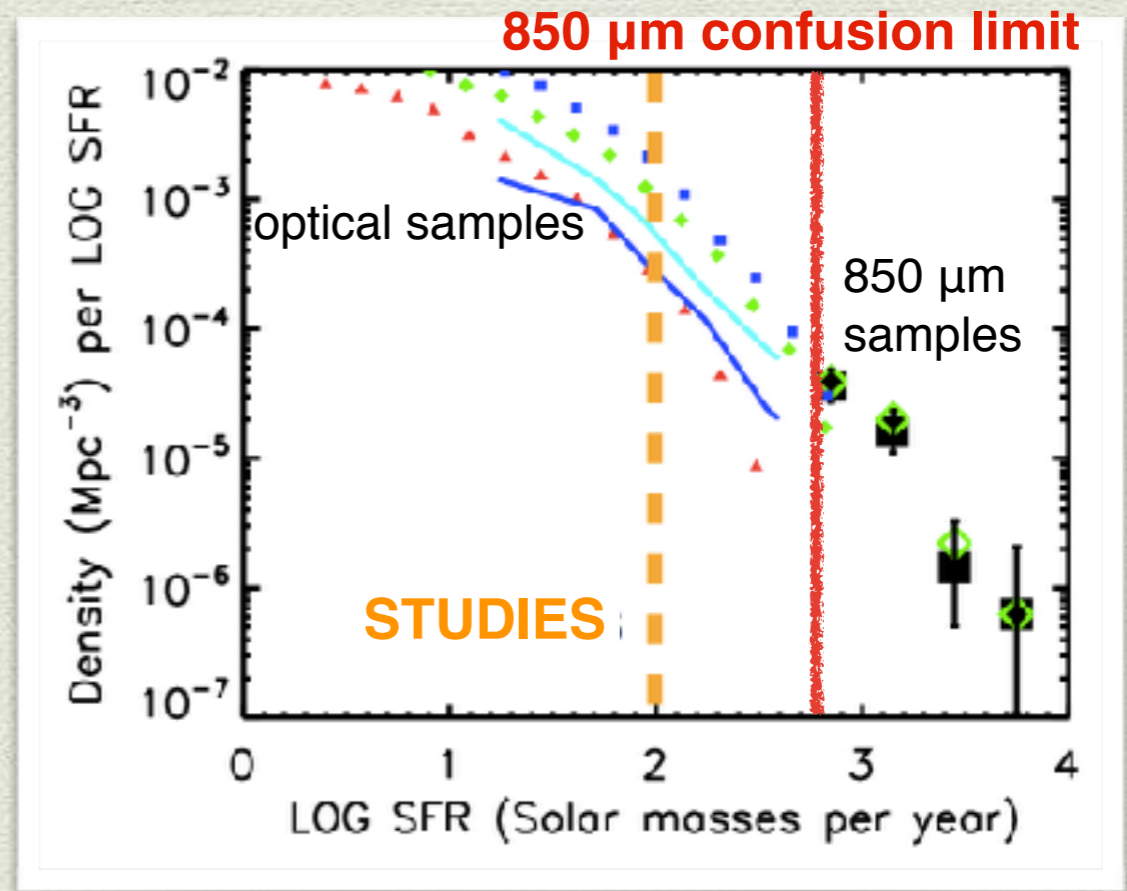
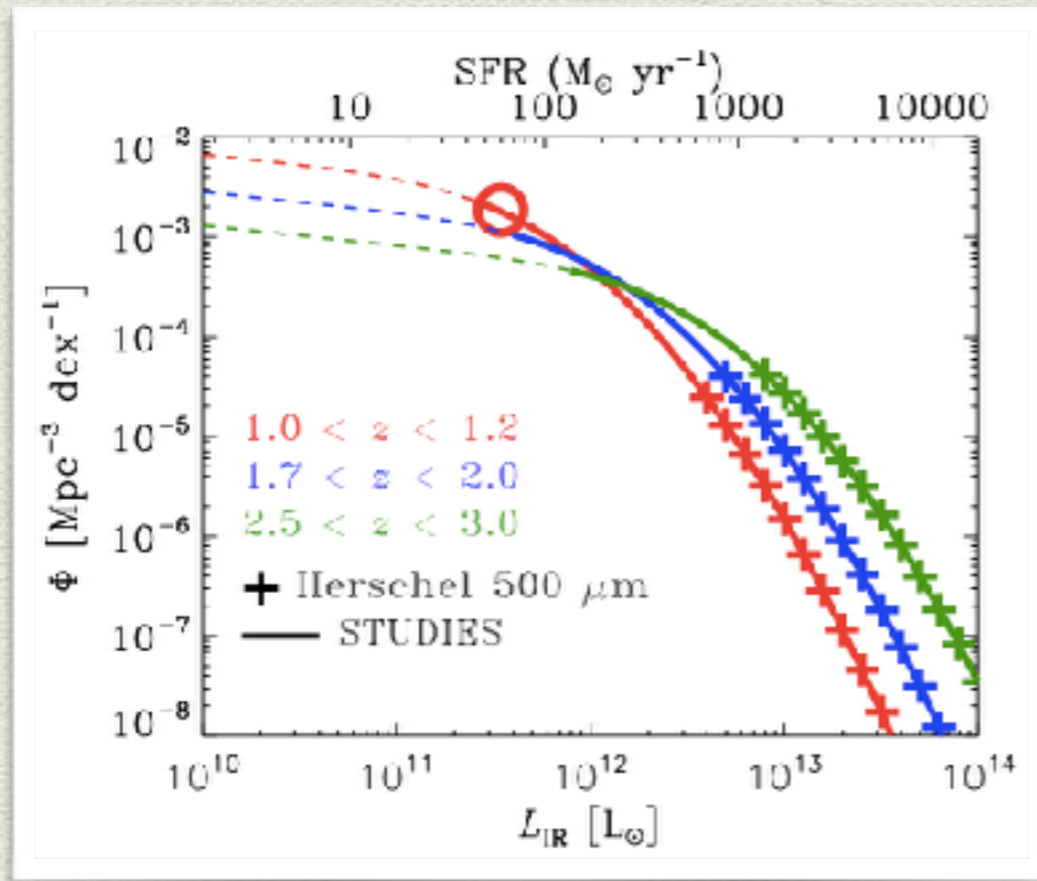


Dole et al. (2006)

- The **optical** and **IR** backgrounds have comparable strengths.
- Half of the activities (star formation + black hole accretion) in the universe are hidden in dust.

STUDIES:

The First Confusion Limited 450 μm Survey

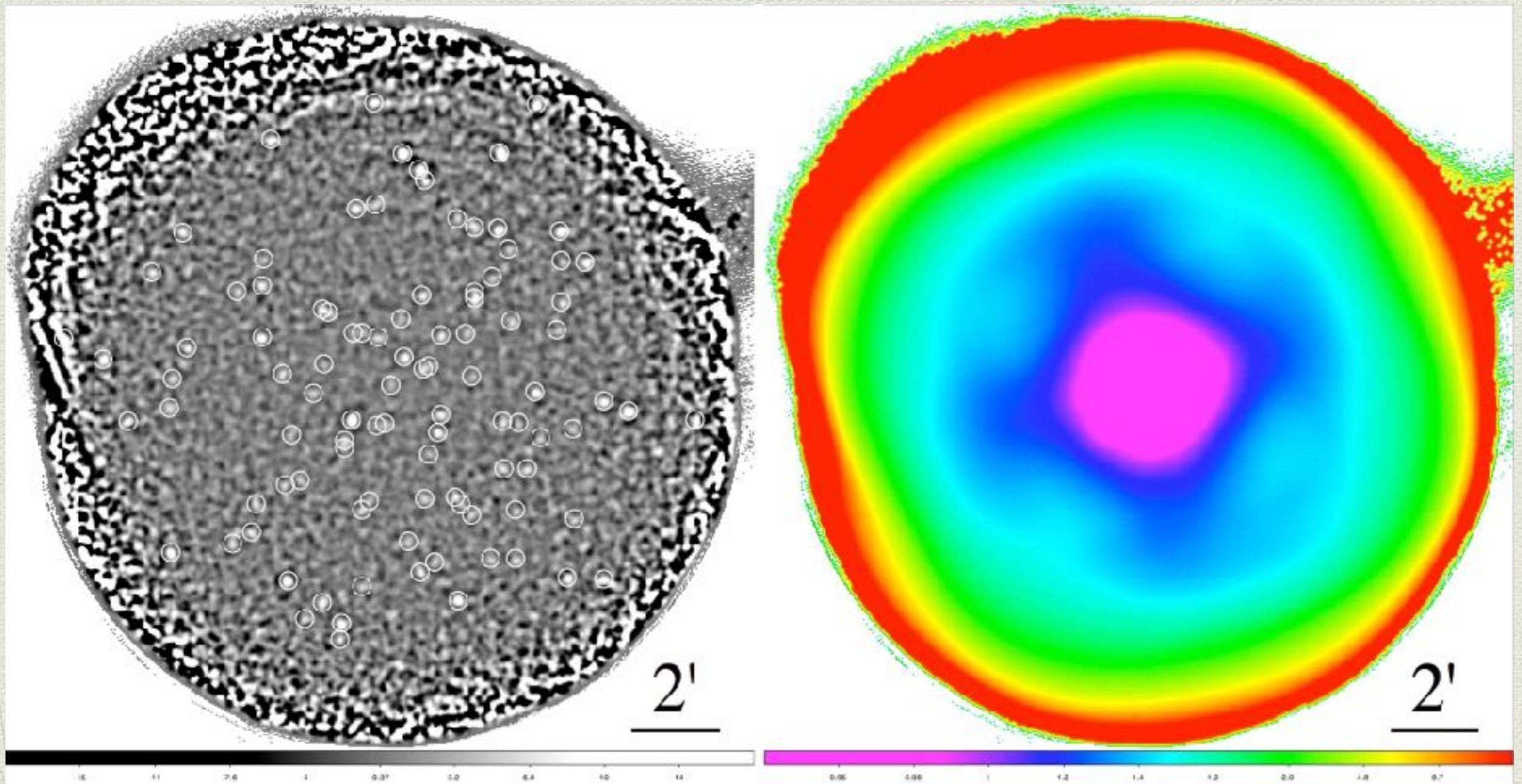


- ◆ STUDIES will detect the most typical members in the dusty galaxy population, key star formers in the history of the universe.
- ◆ STUDIES will significantly overlap, for the first time, with the SFR range probed by optical surveys.

Current Status

- ◆ > 100 team members signed up.
- ◆ A wiki page is used for internal communication, document / data distribution.
- ◆ 129 hr (out of 330 hr) of data obtained, 39% complete.
- ◆ no progress since May 2016.
- ◆ data fully reduced, analyses and science studies underway.

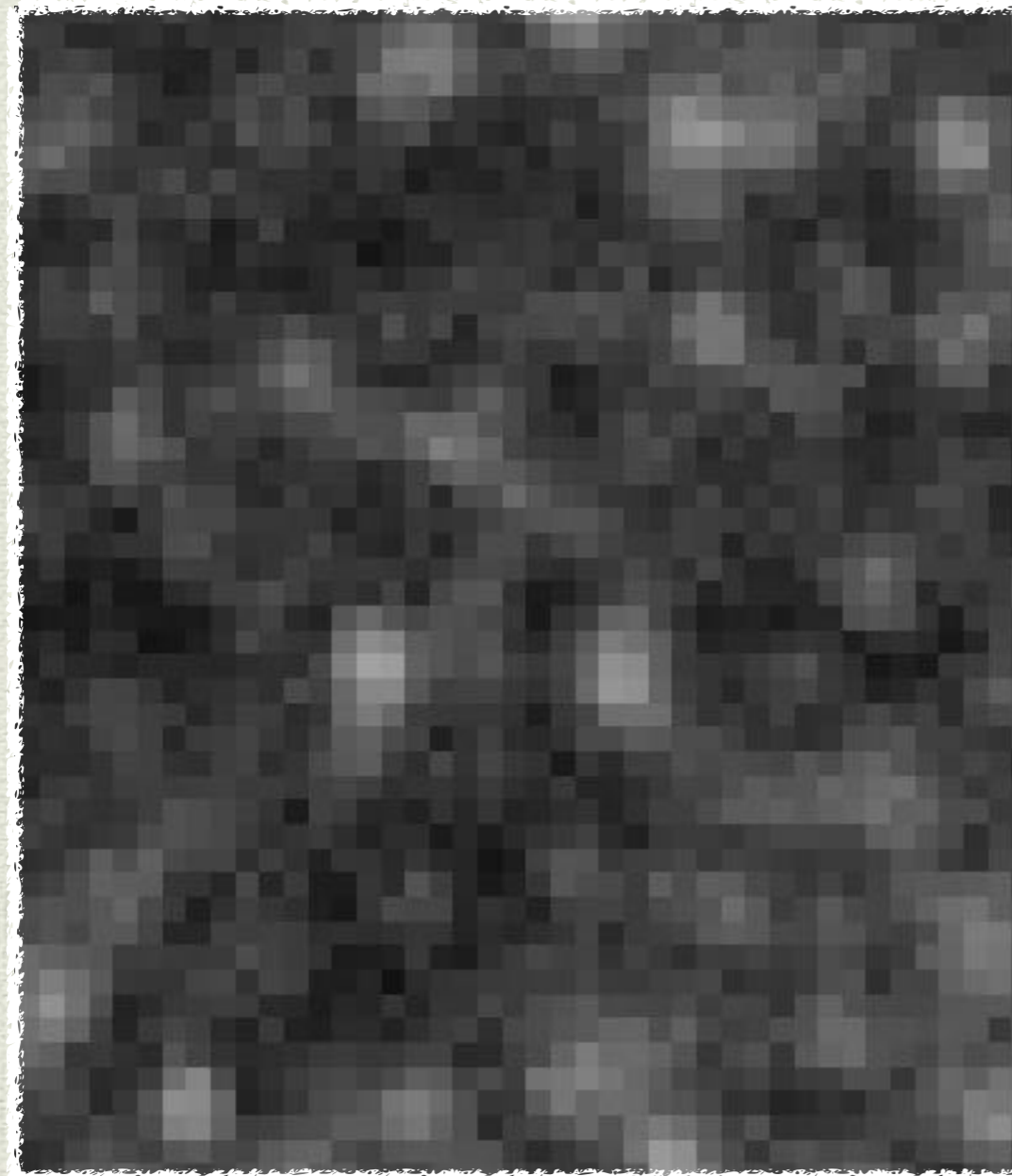
Current Status



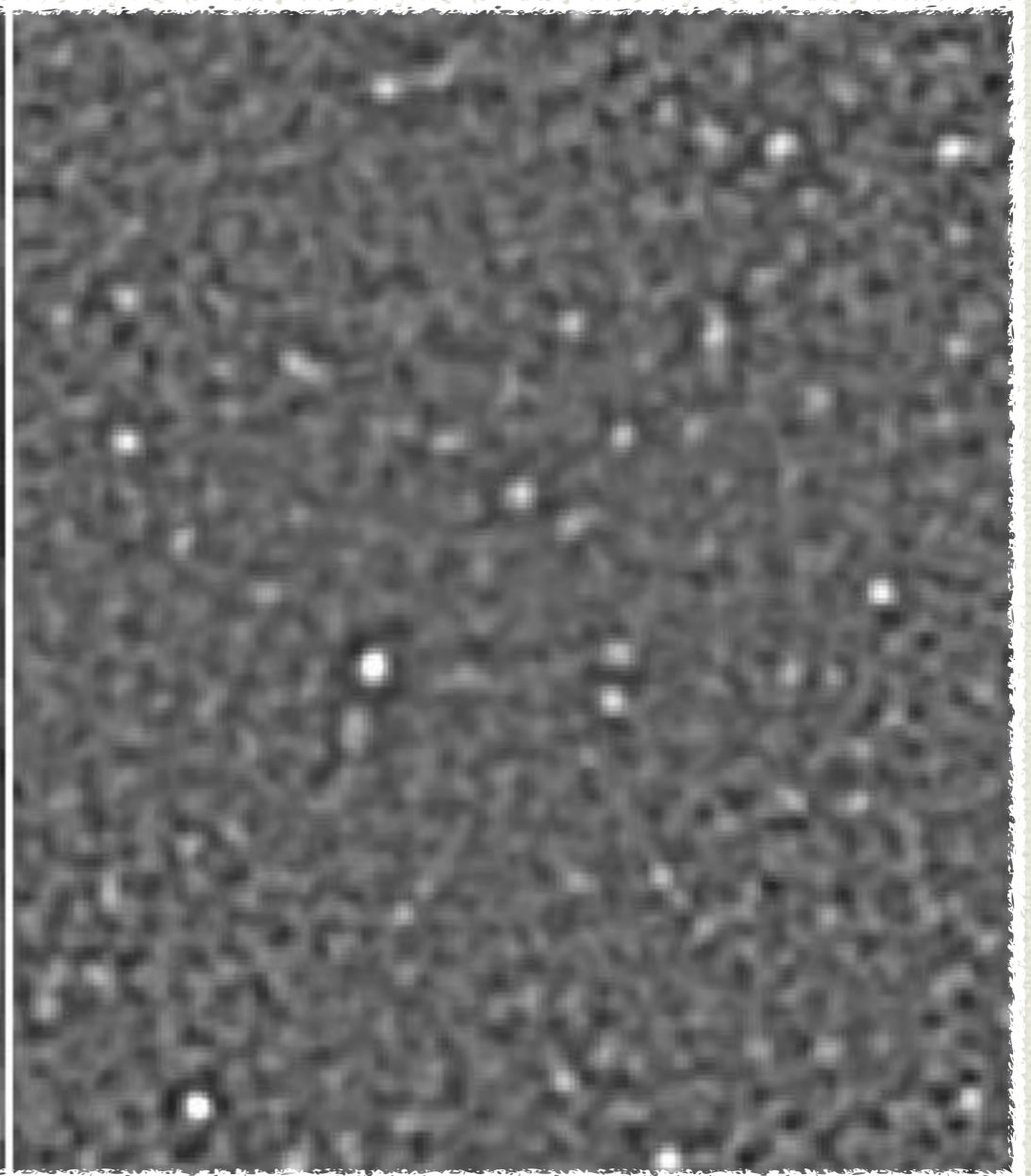
98 sources at $> 4 \sigma$
> 200 expected at full depth

central rms < 9 mJy

Power of SCUBA-2

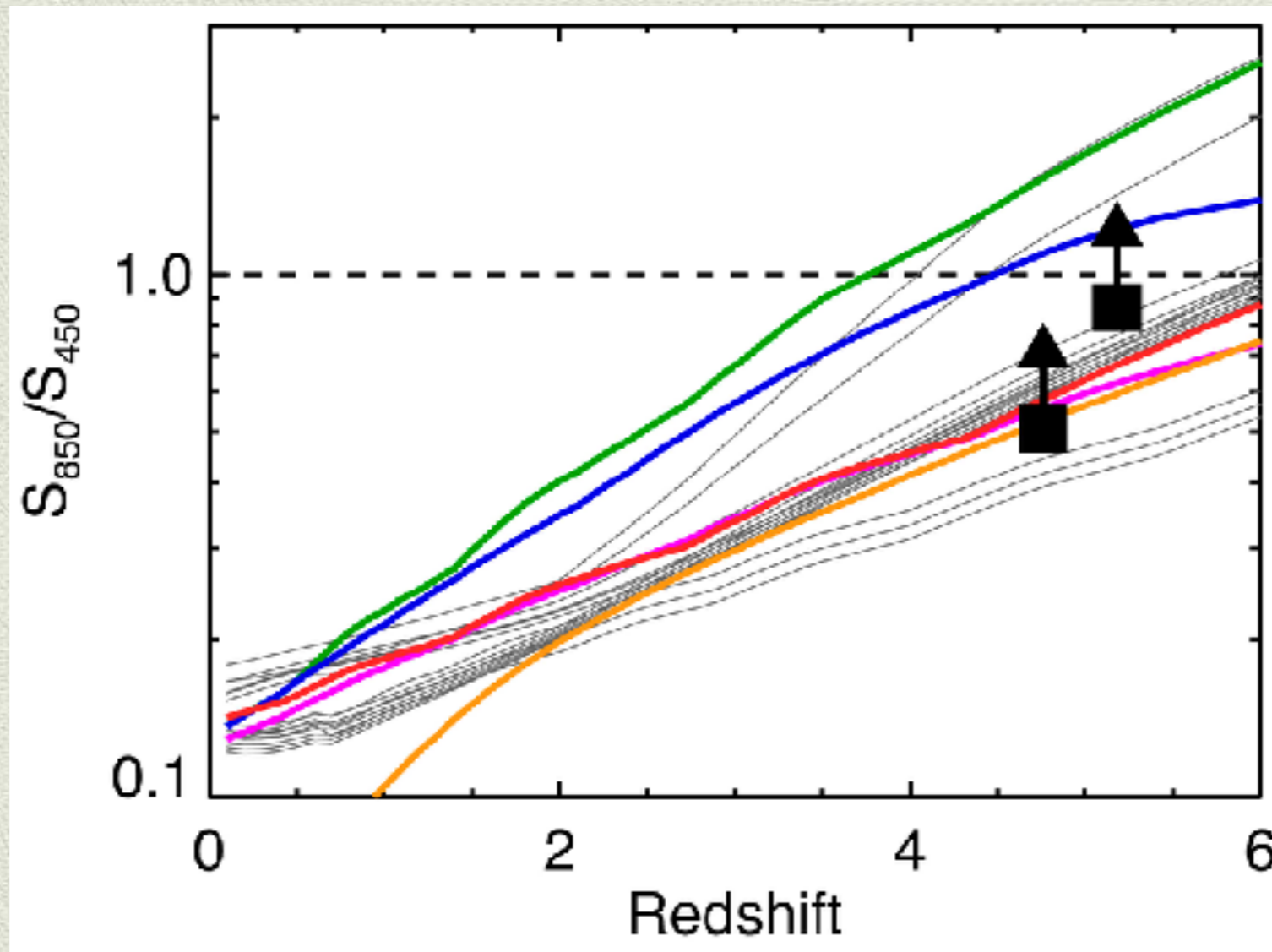


Herschel 500 μm

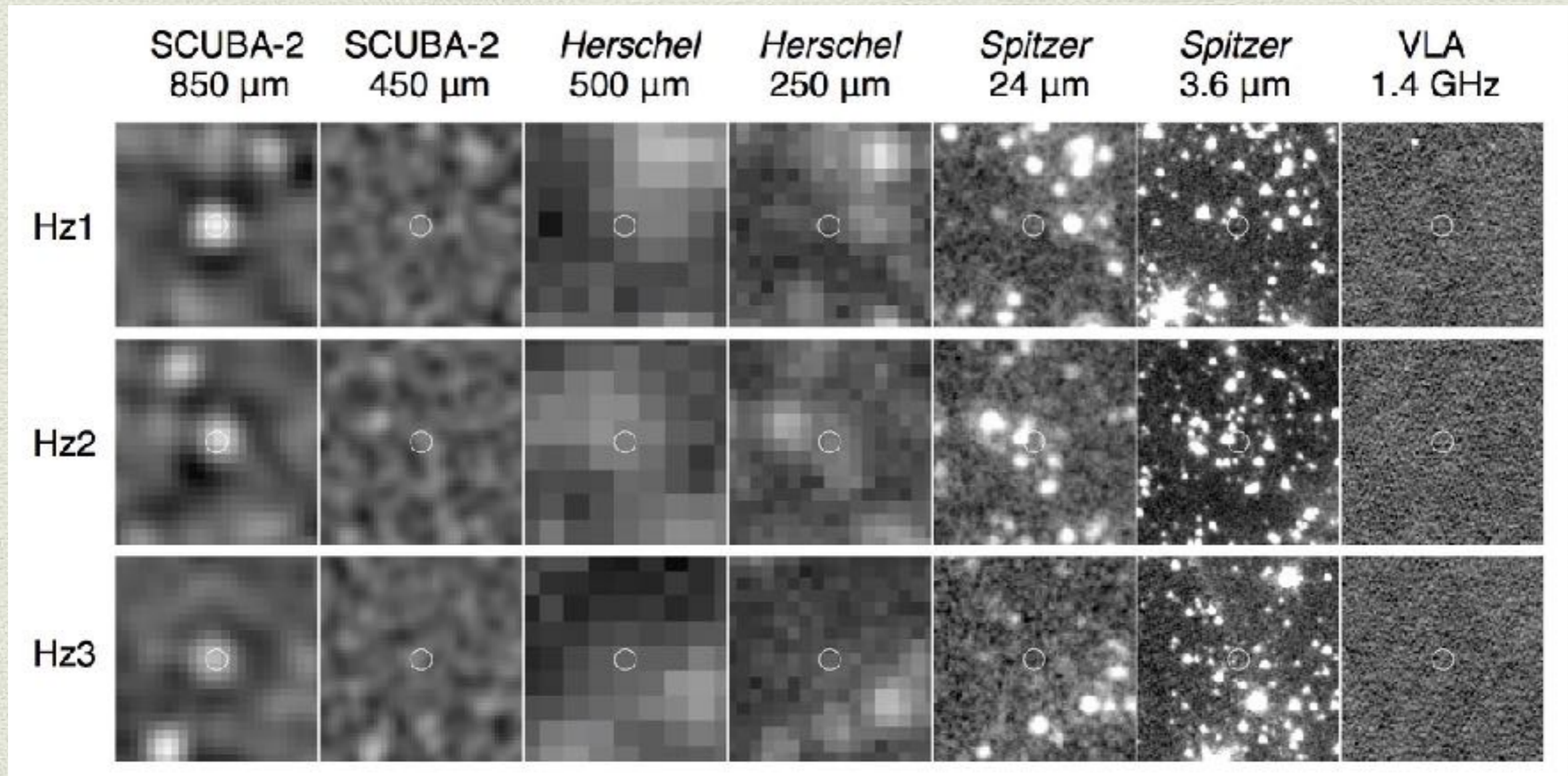


STUDIES 450 μm

Followup of High-z Candidates



Followup of High-z Candidates



awarded SMA and NOEMA time for high-res imaging

One more thing.....

Summary

- ◆ The 1-yr STUDIES data have excellent quality.
- ◆ Project ~40% complete so far.
- ◆ Statistical analyses of the counts and luminosity functions are underway. Number count paper to be submitted in April.
- ◆ Multi-band analyses conducted by various team. High-z candidates are selected and followed up by interferometers.
- ◆ Another paper is drafted, and perhaps will be submitted before the number count paper.