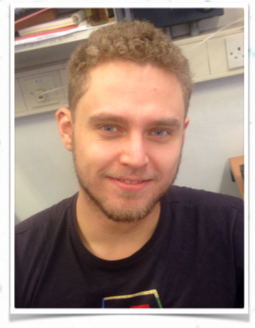
Cosmology using strong lensing

Towards a 1000-lens sample



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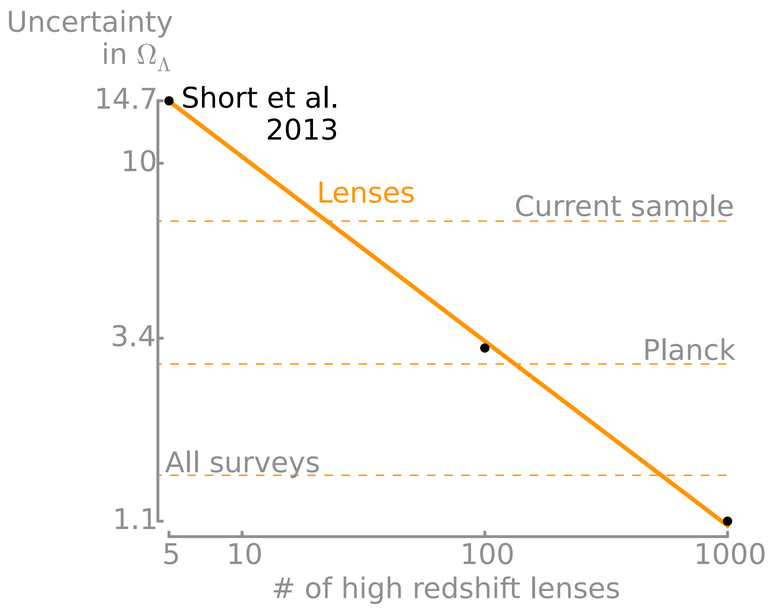
Cosmology

A 1000-lens sample offers better cosmological detail than the **Planck mission**.



Lens and lensed galaxies' **mass** and **distance** provide cosmological information.

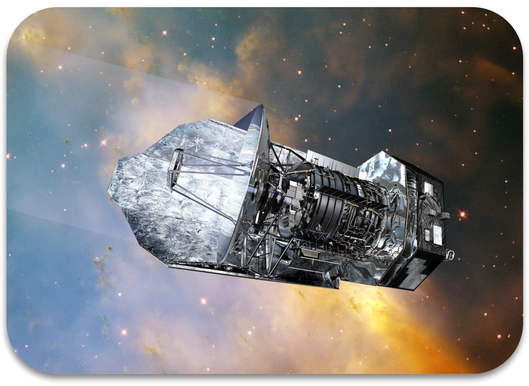
Currently, the largest high-redshift lens samples consist of **26 sources**.

Lens finding

Current **lens finding** strategies aim at galaxies with a $\mathbf{S_{500\mu m} > 100\ mJy}$ and **z > 2**.

Studies suggest **1.5 to 2 lenses** per square degree, making the ***H*-ATLAS** survey a perfect **precursor** for a lens survey.
It detected **300,000 galaxies** over 550 sqr. deg. with *Herschel*'s PACS and SPIRE.

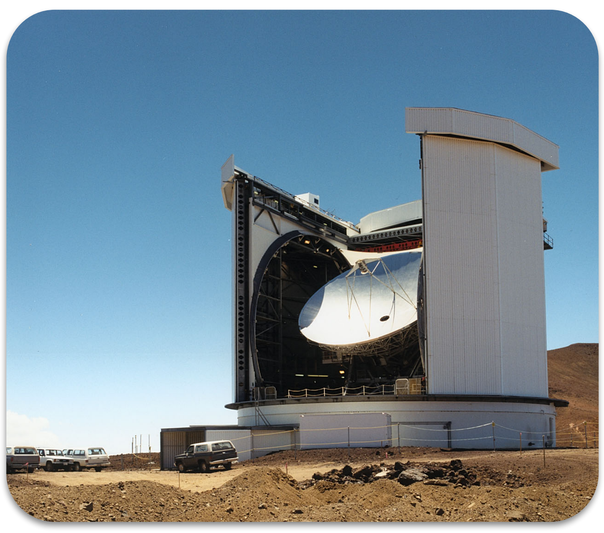
100 µm
160 µm
250 µm
350 µm
500 µm



Observation

The *H*-ATLAS survey might suffer from **source confusion** at long wavelengths and poor **redshift** estimates.

To verify the **potential** of *H*-ATLAS, we observed ~220 possible lenses at **850 µm** with **SCUBA-2** on the James Clerck Maxwell Telescope (**JCMT**).

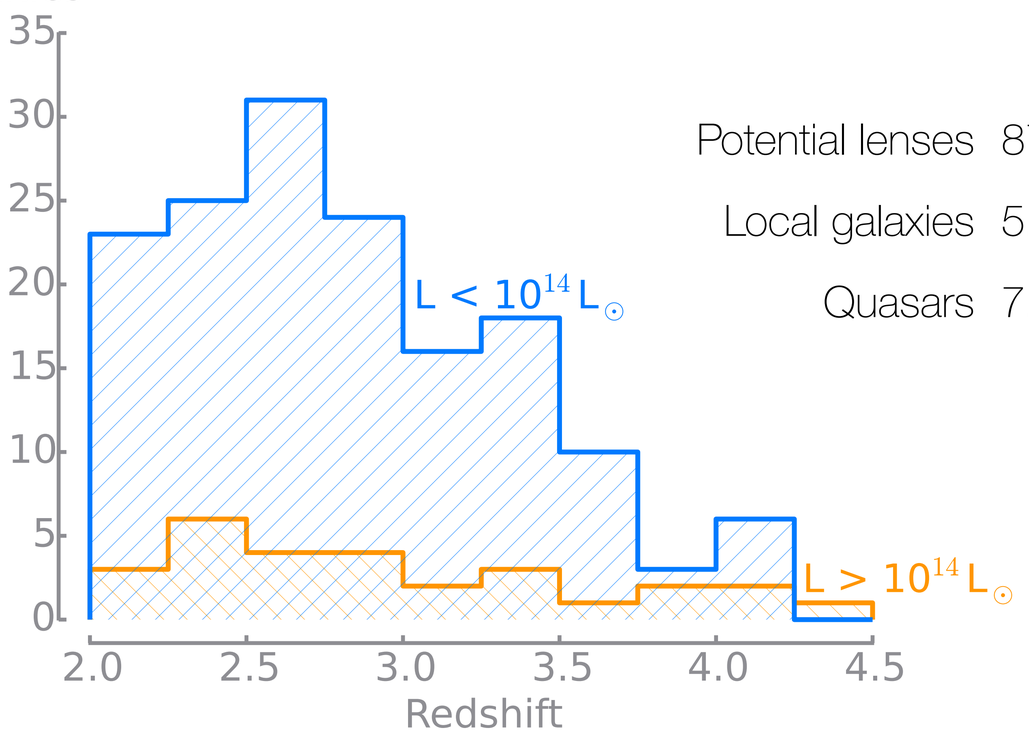


Source confusion can be studied because of JCMT's smaller beam size:

	Herschel			JCMT
λ [µm]	250	350	500	850
Angular size	18”	25”	36”	14”
Surface	158%	306%	634%	100%
Beam size	○	○	○	○

Results

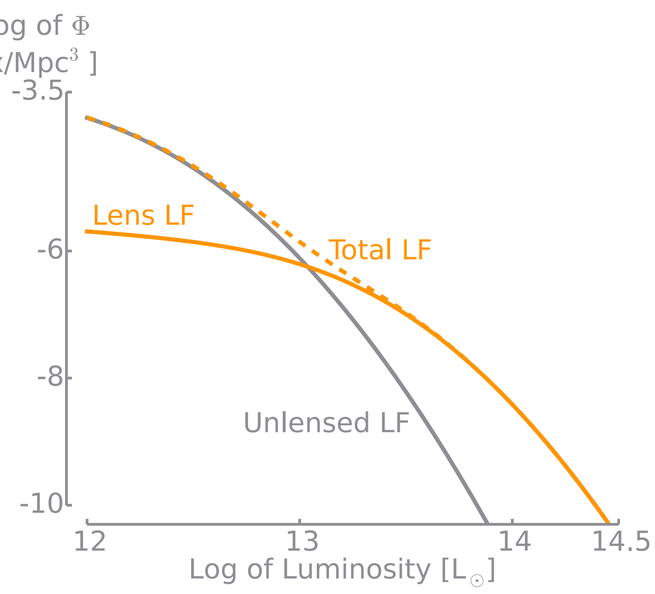
We have observed 215 galaxies, where 13% are contaminants, and **87%** are potential lenses.



Potential lenses	87%
Local galaxies	5.5%
Quasars	7.5%

Future work

We will determine **lensing probabilities** by comparing lensed and unlensed **luminosity functions**,



spectral imaging will provide **spectroscopic redshifts**,

and we will look for associated galaxies in **optical** and **near-infrared** VIKINGS and KIDS surveys.