

# BLAST

And the 2003 Test Flight

**Balloon-borne  
Large-  
Aperture  
Sub-millimetre  
Telescope**

Gaelen Marsden (UBC)



## Outline

- BLAST Instrumentation
- Science Goals
- Photometric Redshifts and Simulations
- The 2003 Test Flight

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## BLAST Instrumentation

- Bolometer detector arrays at 250, 350, and 500  $\mu\text{m}$ .
  - 2-metre carbon fibre mirror
    - Beam sizes of 30, 41, and 59 arcsec
  - Field of view: 6.5 x 13 arcmin
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## BLAST Science

- Extragalactic:
    - Detect ~1000 high-redshift sub-mm sources
    - Photometric Redshifts to  $\Delta z = \pm 0.6$
    - Rest-frame FIR Luminosities
    - Star-formation Rates of High-z Starburst Galaxies
    - 3-dimensional clustering
    - Source lists for future sensitive instruments (SPIRE, LMT, ALMA)
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## BLAST Science

- Galactic
    - Measure cold pre-stellar sources
    - High-resolution maps of diffuse Galactic emission
    - Solar System objects (planets, asteroids)
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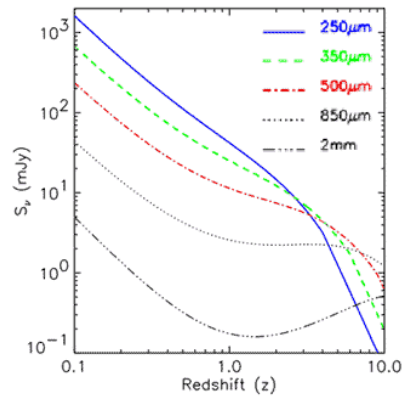
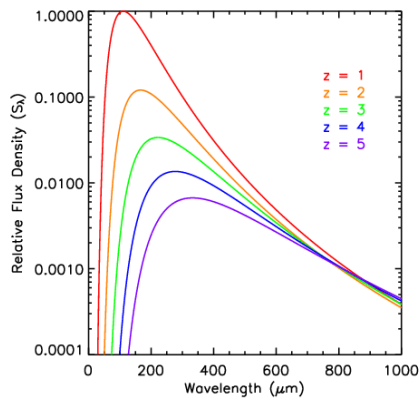
## SHADES :

The **SCUBA HALF-Degree**  
**Extragalactic Survey**

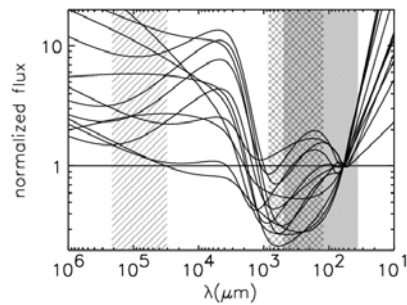
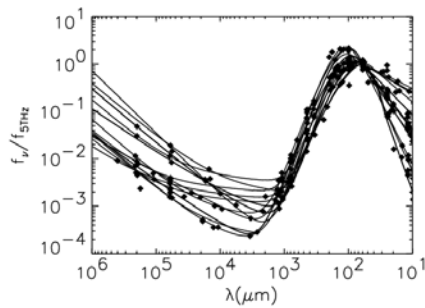
James Dunlop et al.

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# The Negative K-correction

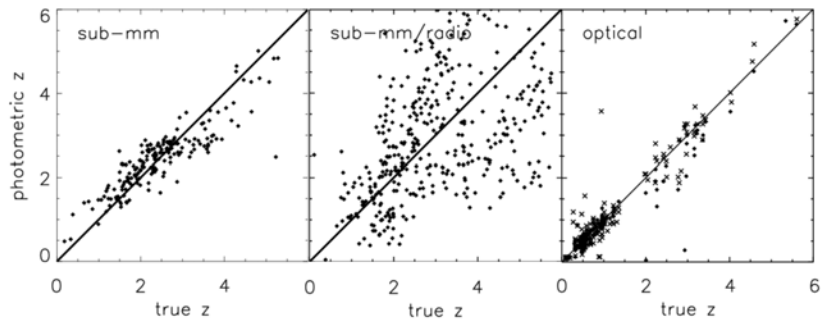


# Sample SEDs

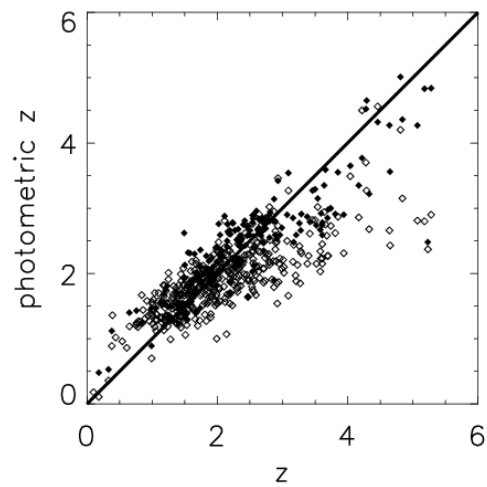


Hughes et al., 2002

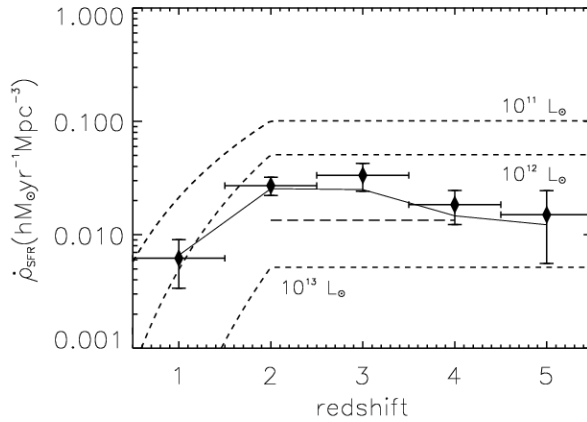
## Photometric Redshifts



## BLAST + SCUBA



## Simulated SFR Measurement



astro-ph/0111547

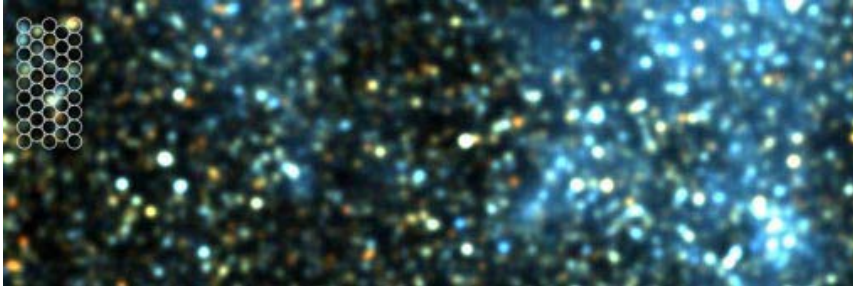
## Estimated BLAST Source Counts

50 hour 250  $\mu\text{m}$  Survey Strategies:

| Survey Area (sq. deg.) | 1 $\sigma$ depth (mJy) | # of pixels | # of Gal. > 5 $\sigma$ | # of Gal. > 10 $\sigma$ | # of 5 $\sigma$ Gal. z > 1 | # of 5 $\sigma$ Gal. z > 3 |
|------------------------|------------------------|-------------|------------------------|-------------------------|----------------------------|----------------------------|
| 1.0                    | 5                      | 18334       | 835                    | 265                     | 765                        | 147                        |
| 2.0                    | 7                      | 36668       | 1012                   | 291                     | 927                        | 151                        |
| 4.0                    | 10                     | 73336       | 1100                   | 294                     | 988                        | 147                        |
| 9.0                    | 15                     | 165006      | 1111                   | 247                     | 1023                       | 129                        |
| 36.0                   | 30                     | 660024      | 990                    | 246                     | 895                        | 105                        |

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## Simulated BLAST Map



By David Hughes and Ed Chapin

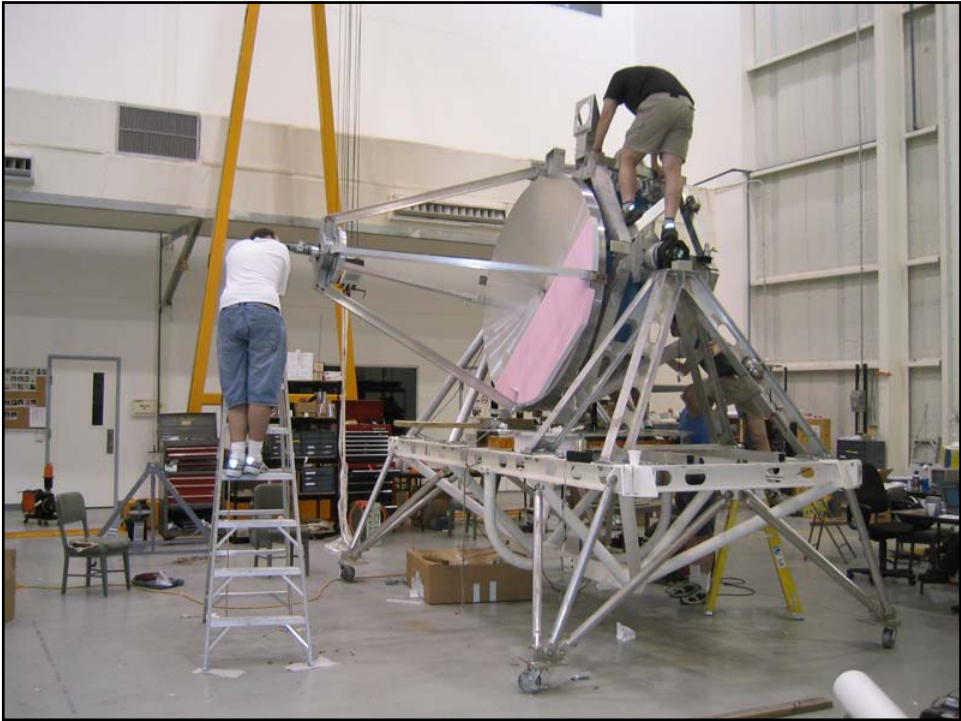
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## BLAST Flight Test

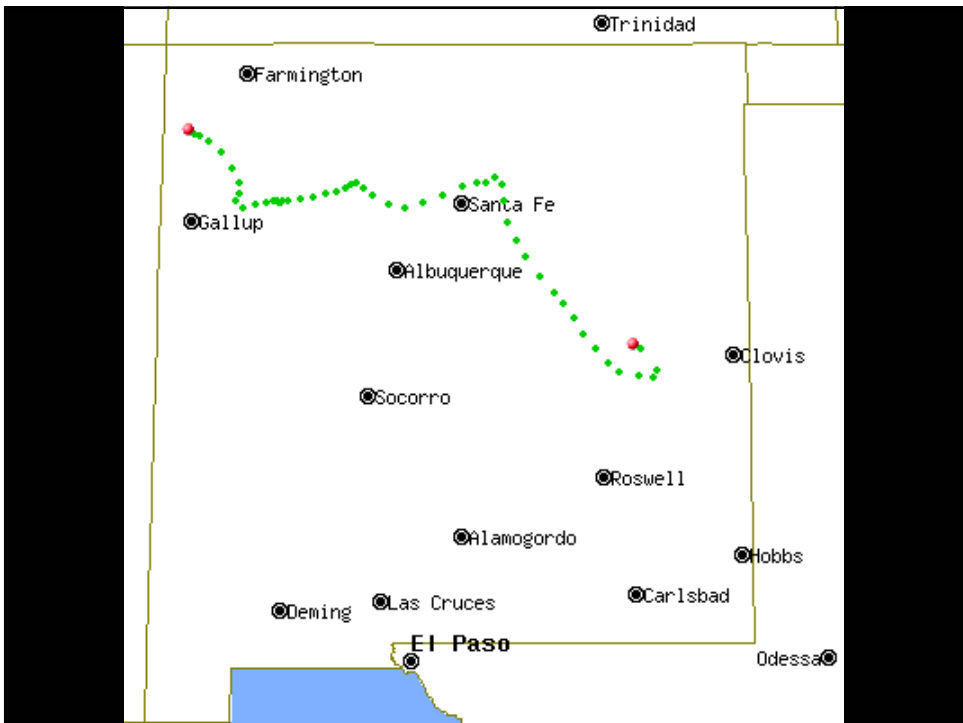
Ft. Sumner, New Mexico  
Aug – Sept 2003

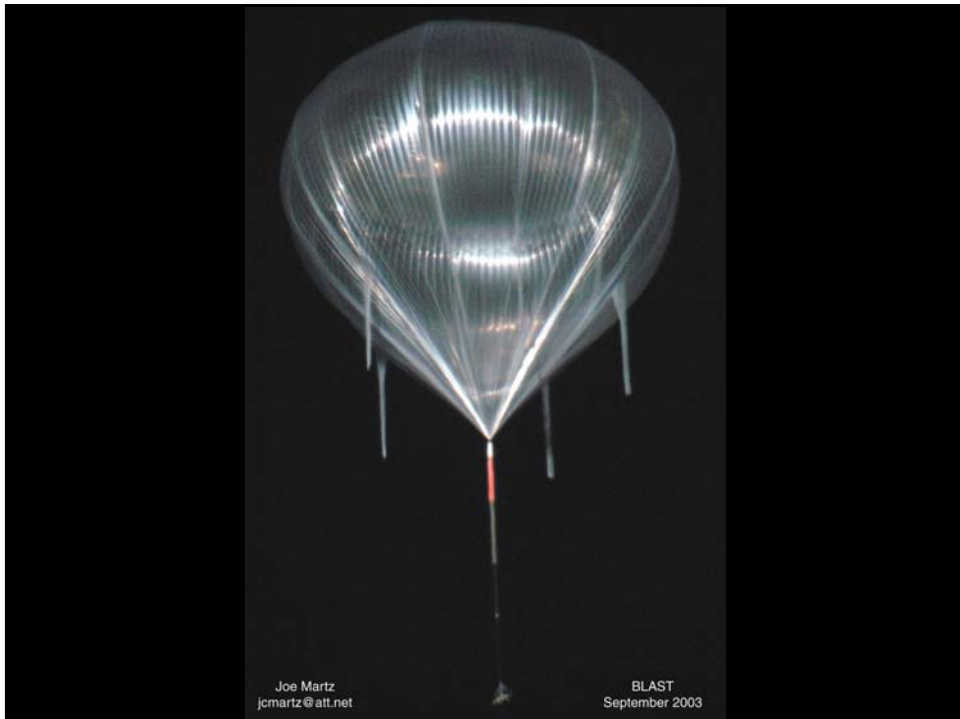
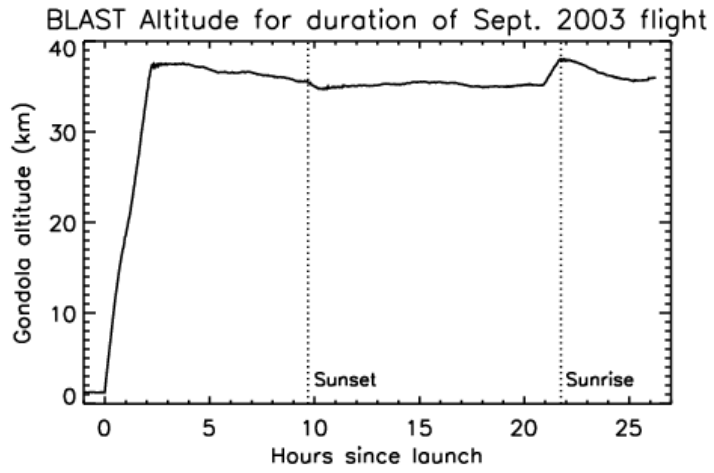
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# BLAST Personnel

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Prof. James Bock

**Universidad de Puerto Rico:**

Prof. Luca Olmi

**Pictures by Donald Wiebe, Matt Truch, Joe Martz, and Gaelen Marsden**

