

The Bolocam 1.1mm Galactic Plane Survey

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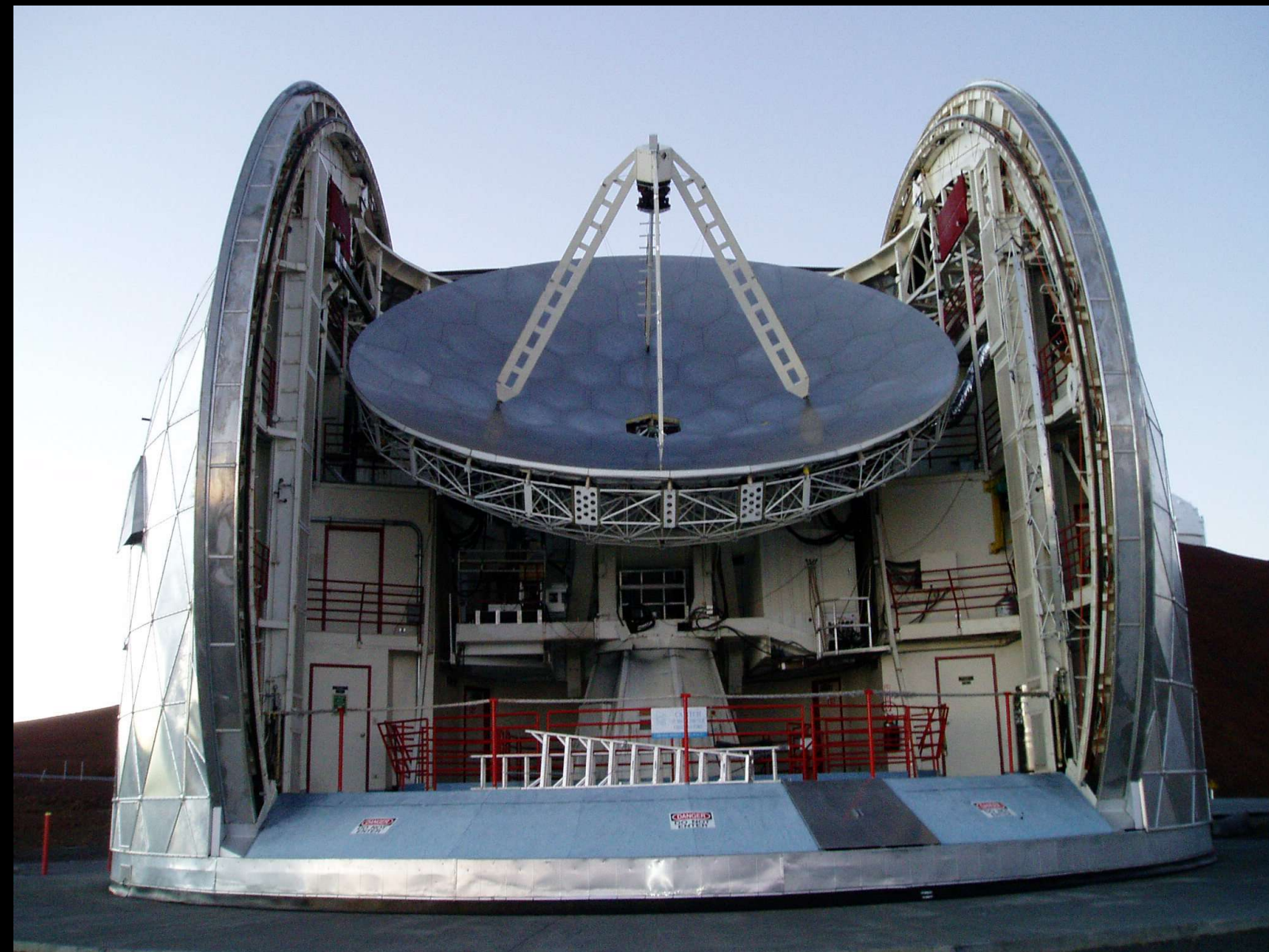
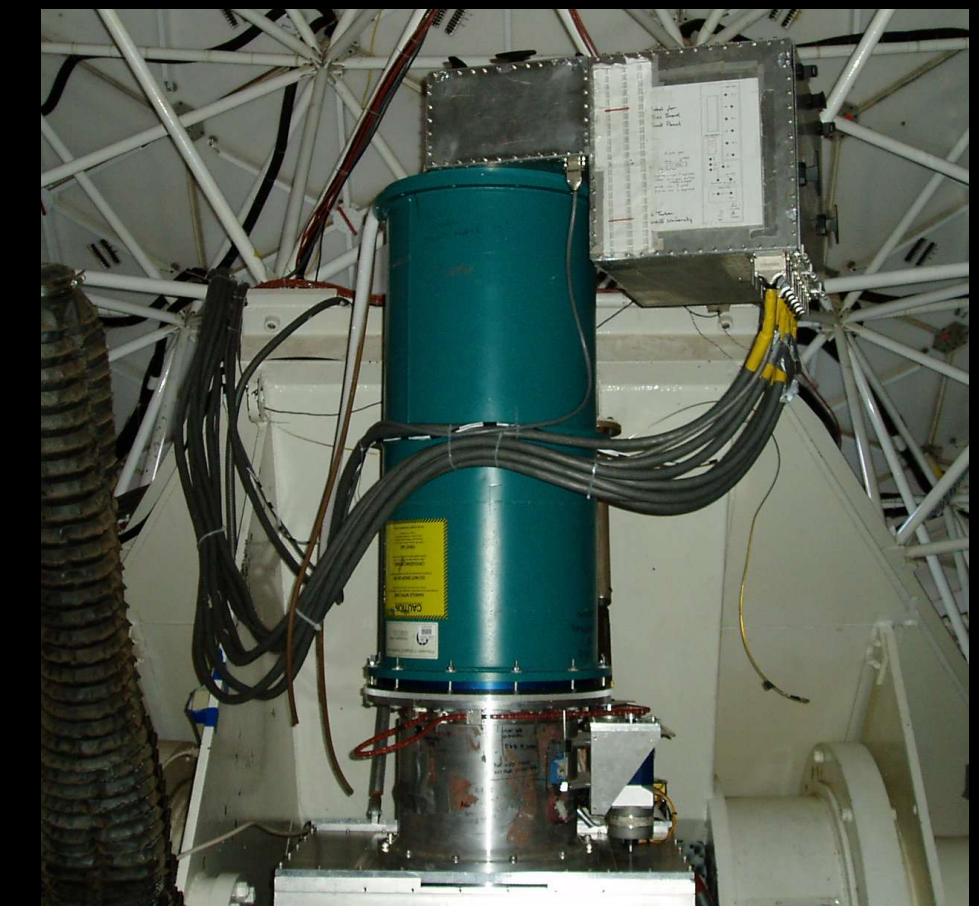
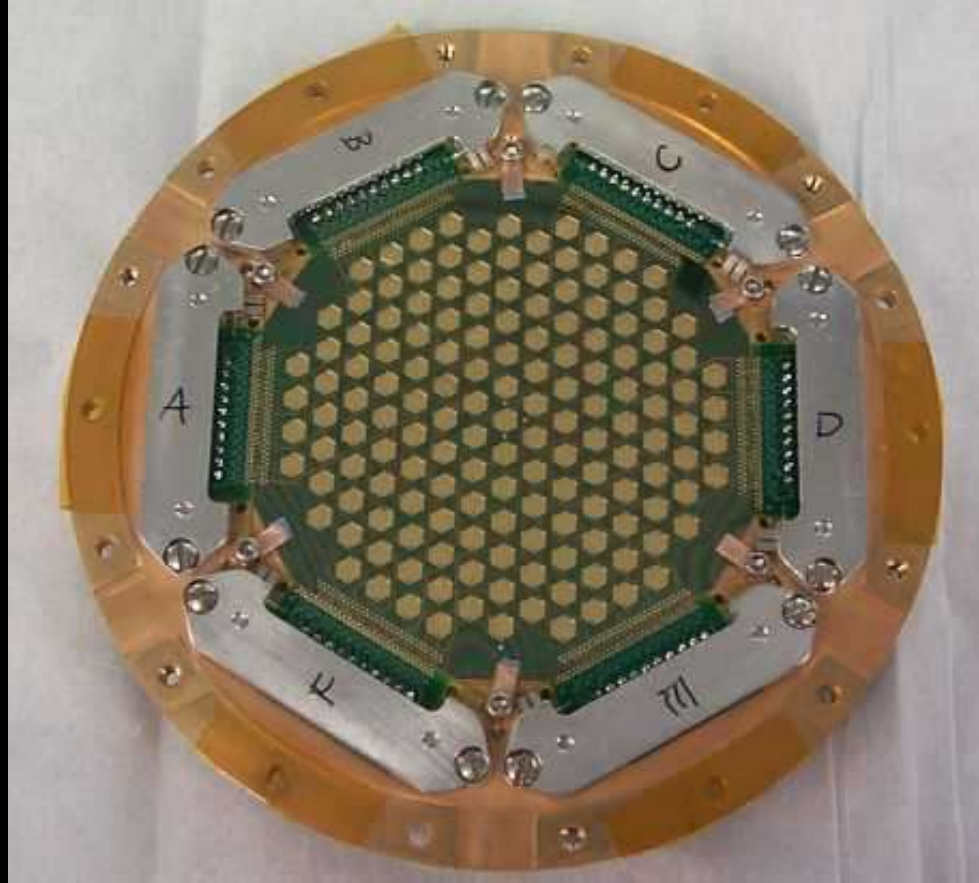
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We have mapped approximately 100 square degrees of the Galactic Plane at 1.1 mm with Bolocam on the Caltech Submillimeter Observatory. The survey coverage includes the Galactic Center, most of the molecular ring, and many active star-forming regions such as Cygnus X and the W3/4/5 region. This is the first unbiased survey of emission from cold dust associated with massive star and cluster formation. Images and source catalogs will be publicly available.

THE INSTRUMENT: BOLOCAM

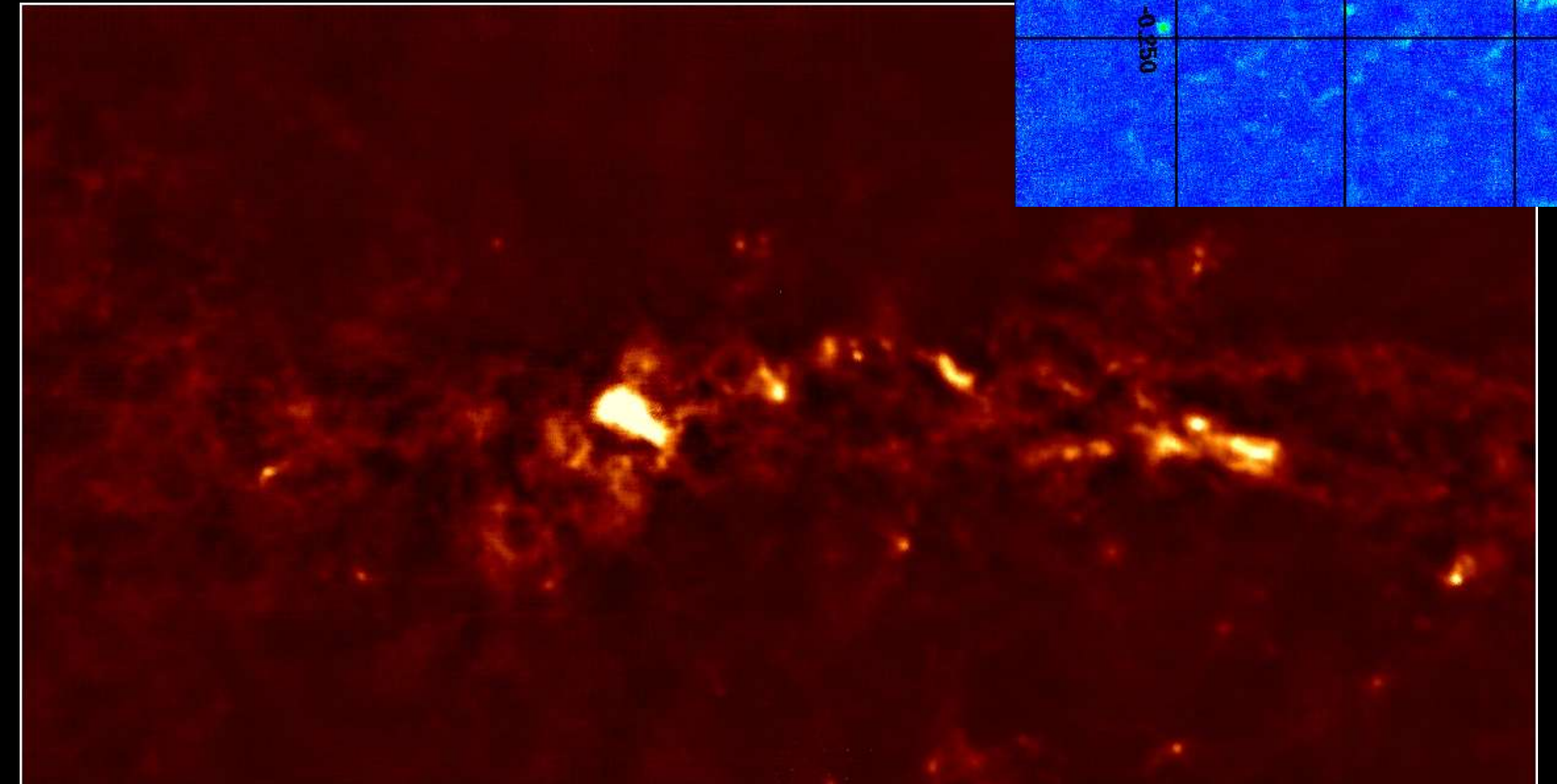
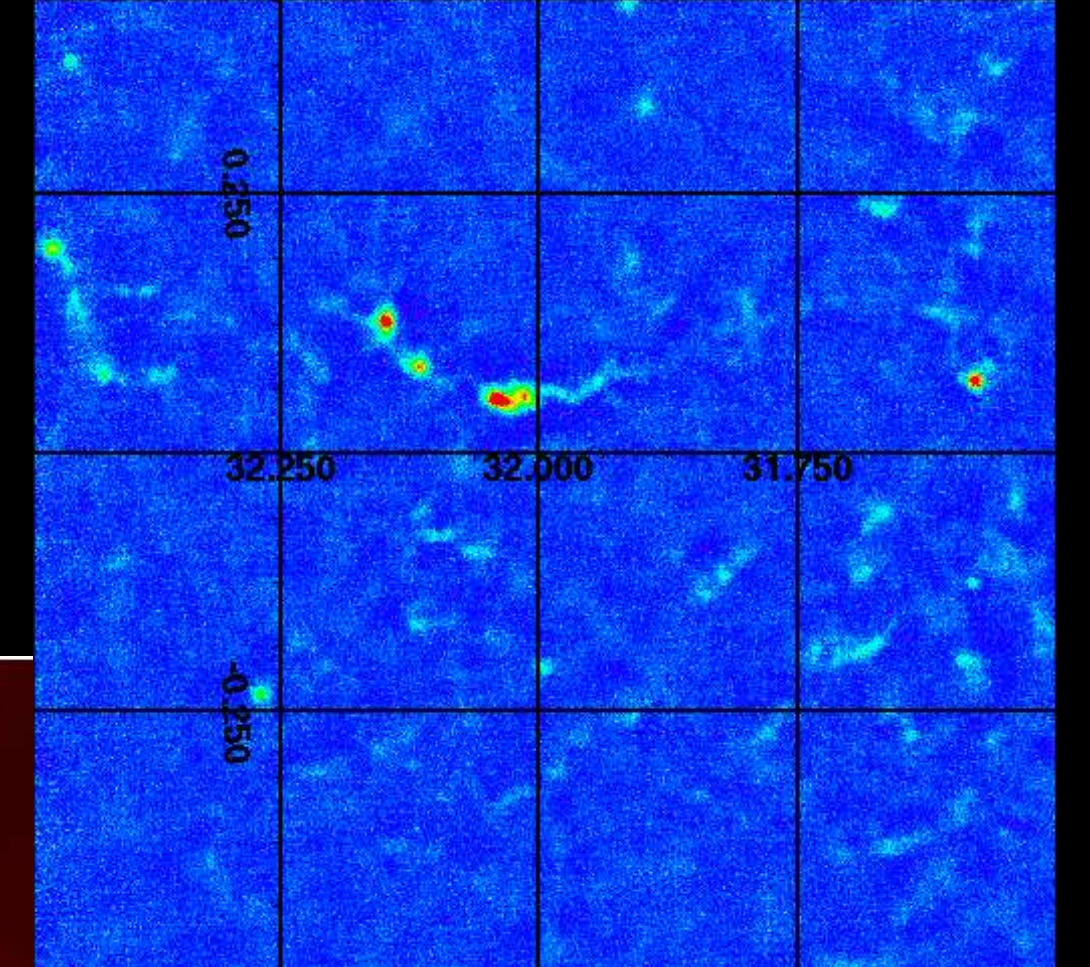


Bolocam is an array of 115 bolometers which operate at 1.1 or 2.1 mm. Bolocam is a facility instrument at the Caltech Submillimeter Observatory on Mauna Kea. It has an instantaneous field of view of 8 arcmin, and a beam size of 30 arcseconds.

THE RESULTS: IMAGES

Right: $1^\circ \times 1^\circ$ image of the $l=32^\circ$, $b=0^\circ$ field. This image is a coadd of 12 observations.
Below: $2^\circ \times 1^\circ$ coadded image of the Galactic Center region, 1.5° (left edge) $> l > -0.5^\circ$ (right edge).

At the target depth of the survey (15 mJy) we are able to detect point-like sources as well as more extended diffuse structure.



THE SURVEY COVERAGE

The survey covers the Galactic center, and the molecular ring with continuous coverage of $-10^\circ < l < 57^\circ$ with $|b| < 0.5^\circ$. We extended the coverage to include the Cygnus X region, the W3/4/5 region, as well as the Perseus Arm. The survey coverage by Galactic longitude is as follows:

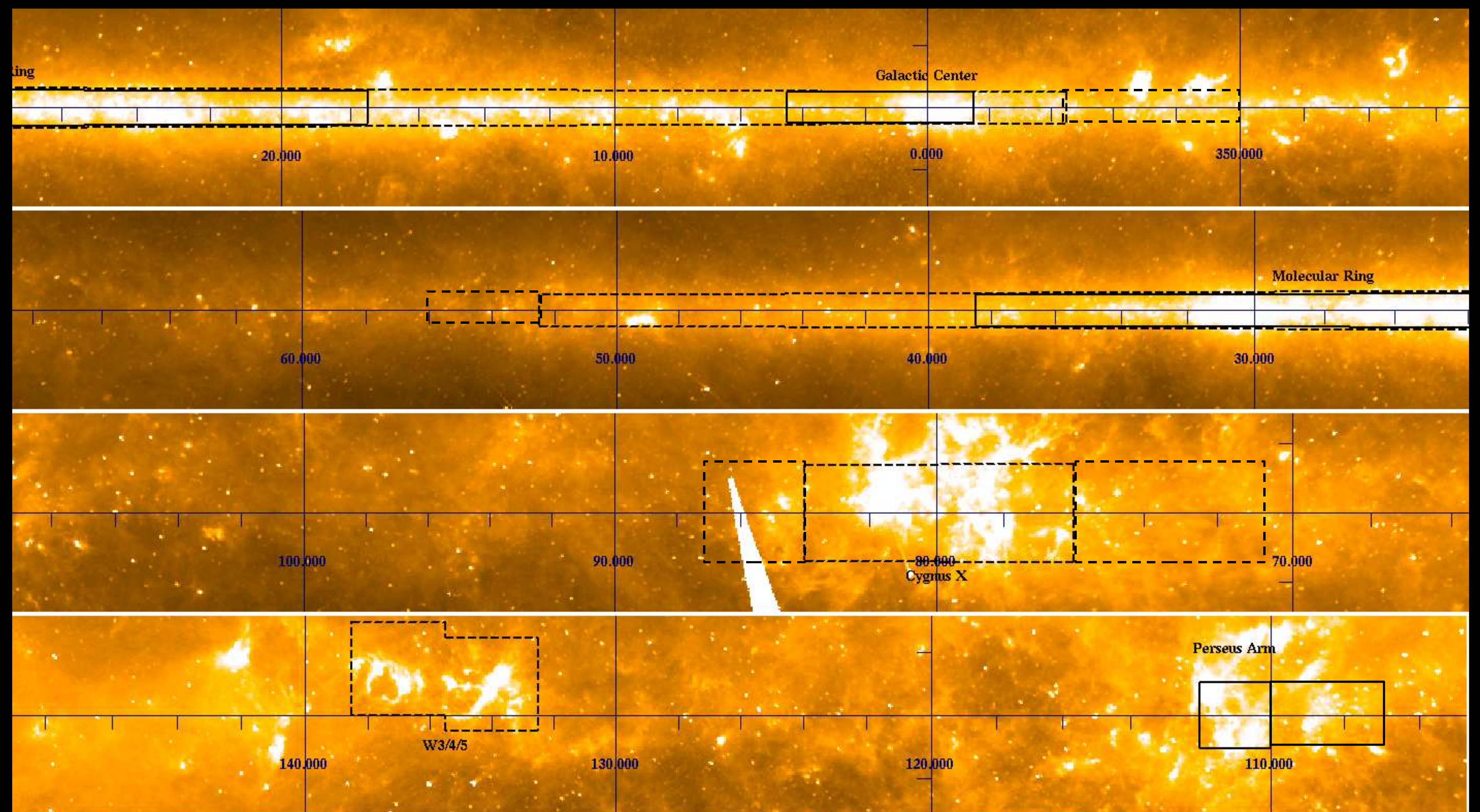
$$-10^\circ < l < 56^\circ, |b| < 0.5^\circ$$

$$\text{Cygnus X region } (71^\circ < l < 87^\circ, |b| < 1^\circ)$$

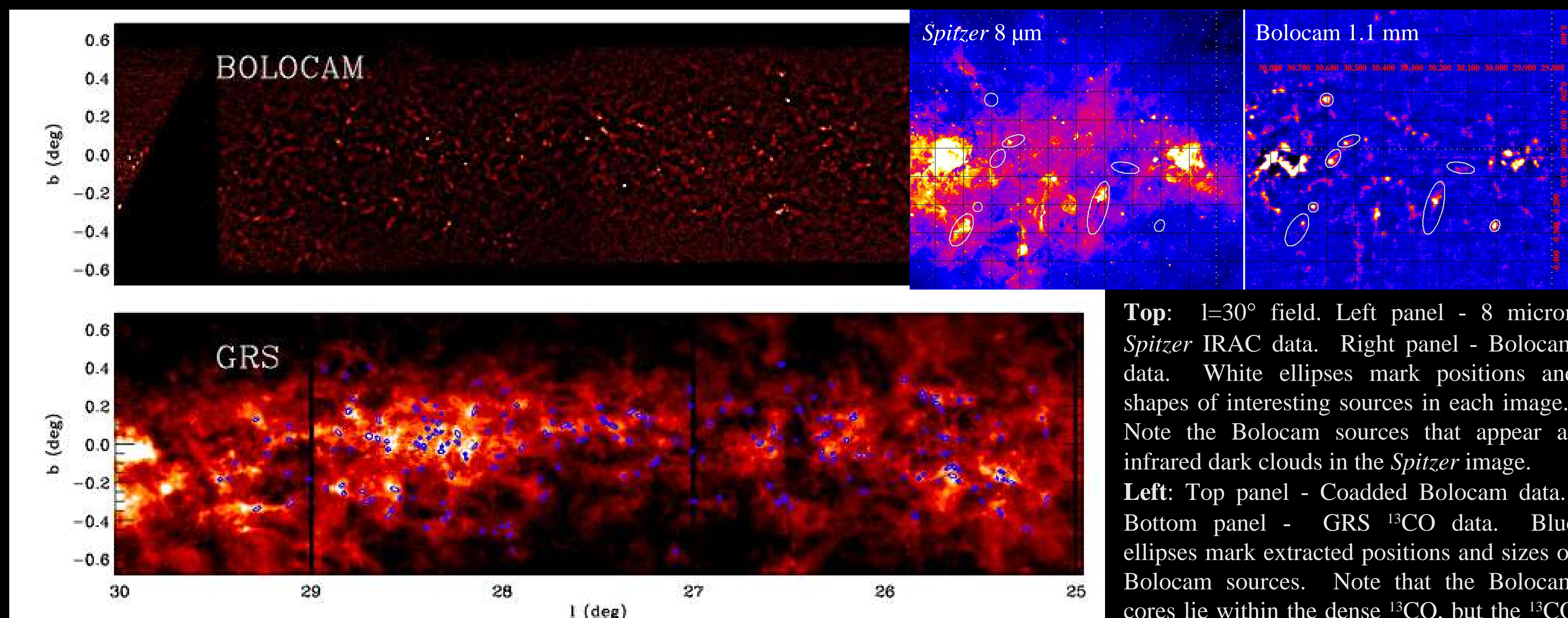
$$\text{Perseus Arm } (107^\circ < l < 112^\circ, |b| < 1^\circ)$$

$$\text{W3/4/5 region } (133^\circ < l < 139^\circ, -0.25^\circ < b < 1.5^\circ)$$

Survey coverage is shown superimposed on 12 μm IRAS images on the right. Solid lines indicate coverage to the target depth (15 mJy), and dotted lines indicate moderate depth (30 - 60 mJy).



MULTIWAVELENGTH COMPARISON



Top: $l=30^\circ$ field. Left panel - 8 micron *Spitzer* IRAC data. Right panel - Bolocam data. White ellipses mark positions and shapes of interesting sources in each image. Note the Bolocam sources that appear as infrared dark clouds in the *Spitzer* image.
Left: Top panel - Coadded Bolocam data. Bottom panel - GRS ^{13}CO data. Blue ellipses mark extracted positions and sizes of Bolocam sources. Note that the Bolocam cores lie within the dense ^{13}CO , but the ^{13}CO does not identify the Bolocam cores.

SCIENCE GOALS

With the first unbiased sample of massive star forming regions, a few of the science topics the team will address are:

1. Statistics of pre-stellar and star forming cores and their environments.
2. Correlation of Bolocam cores with Galactic structures including IRDCs, supernova remnants, HII regions, etc.
3. Distribution of massive dense cores within the Galaxy.

The survey will be completed by Spring 2008. FITS images and source catalogs will be made public via IPAC.