CCAT from the Astro2010 Perspective

Disclaimer: Any similiarity between these remarks and the reports of the Astro2010 Committee and its Radio/Millimeter/Submm panel is entirely coincidental. Think of the talk as informed speculation. I am not speaking for the Committee.

Some defining characterics of Astro 2010

- science ⇒ requirements ⇒ projects/facilities;
- independent cost & technical readiness (risk) assessment;
- recommended program had to fit a plausable budget, based on guidelines from the agencies.

Survey Organization

- Committee was divided into three subcommittees - Science Frontiers, Program & Priorities, and State of the Profession;
- Each had independent panels - Science had five, P&P had four, SOP had seven (study groups).

RMS Panel Report

CCAT will address five key questions identified by three of the five science frontier panels:

- **How do baryons cycle in and out of galaxies and what do they do while they are there?**
- **What are the first objects to light up the universe and when did they do it?**
- **What controls the mass-energy-chemical cycles within galaxies?**
- **How do stars form?**
- **How do circumstellar disks evolve and form planetary systems?**

RMS Panel Report

The cost and technical readiness evaluation found a cost of $138M, only 25% more than the project's estimate of $100M (most of the extra in reserves), and judged the risks to be "moderate".

RMS Panel Report

- "ALMA will have a very limited field of view, only arc-seconds across. A large field mapper operating a mm and submm wavelenghts is required to pave the way for higher resolution follow-up observations with ALMA."
- "CCAT wide-field surveys will drive much of the science to be done with ALMA."

Discovery Potential

$DP = (\text{Diameter})^2 \times (\#\ \text{of pixels})$

$= 10^5$ 30m w/ MAMBO 2

$= 3\times10^6$ JCMT w/ SCUBA 2

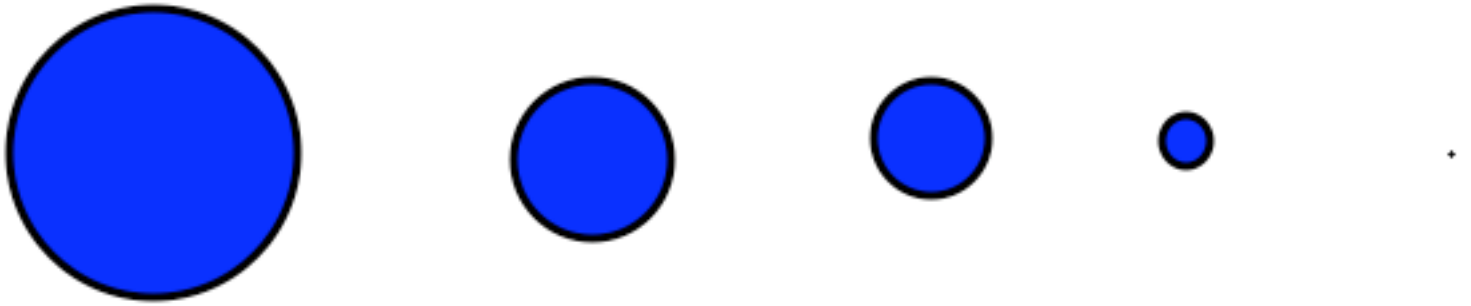
$= 3\times10^4$ APEX w/ LABOCA

$= 3\times10^7$ CCAT

CCAT & ALMA

Shall we dance?

Fields of View at 345 GHz = 850μm



CCAT	APEX	JCMT	30m	ALMA
20′	11′	8′	3.3′	0.3′

Astro 2010 Report
"New Worlds, New Horizons"

"CCAT will complement ALMA by finding many of the sources that ALMA will follow up. … CCAT is called out to progress promptly to the next step in development because of its strong science case, its importance to ALMA, and its readiness."

Astro 2010 Report "New Worlds, New Horizons"

- Second highest ranking for large (NSF) groundbased projects is a competed mid-level program (20-100M$);
- CCAT is the only medium scale ground-based project to be ranked - the poster child for the recommended mid-level NSF program ($37M cost to NSF);
- Extraordinary opportunity for CCAT.

Summary

- Budget realities may mean that few Astro 2010 recommendations actually happen in the next decade;
- It is possible that CCAT is the *only* major project NSF does;
- Private & non-federal money, together with the ALMA connection, are huge advantages in the competiton for funds;
- Start now!