

# SMA Metrics: Proposals, publications, student training

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# Outline

- Overview of proposal/TAC process
- Proposal statistics
- Publications
- Data Archive
- Student training/Outreach

# Proposals\*

- Two observing semesters per year (May 16 – Nov. 15, and Nov. 16- May 15).
- Proposal submission through SMA Observer Center (SMAOC).
- SMAOC provides up-to-date information on all projects and is the interface between users and the observatory.

\*Large scale proposals (100-1000h) will be covered in Keto's talk

# SMA Observer Center

Home

Proposing

Preparing to Observe

After Observing

Tools

Specs

Contact Us

My Projects

Operations

Reference

Document Index

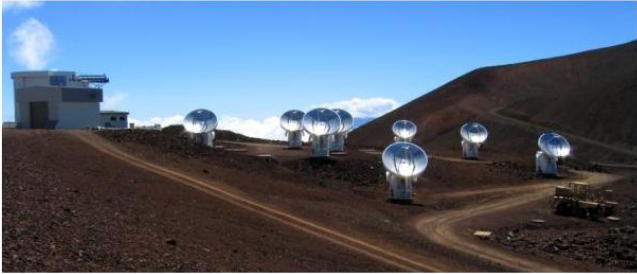
Operations Log

Mauna Kea Summit

Scheduler

Log out

Welcome gpetipa



The Submillimeter Array (SMA) is an 8-element radio interferometer located atop Mauna Kea in Hawaii. Operating at frequencies from 180 GHz to 900 GHz, the 6m dishes may be arranged into configurations with baselines as long as 500m, producing a synthesized beam of sub-arcsecond width. Each element can observe with two receivers simultaneously, with 2 GHz bandwidth each. The digital correlator backend allows flexible allocation of thousands of spectral channels to each receiver. The Submillimeter Array is a joint venture of the Smithsonian Astrophysical Observatory and the Academia Sinica Institute of Astronomy and Astrophysics.

Public Links

User Link

Staff Links

Special Access Link(s)

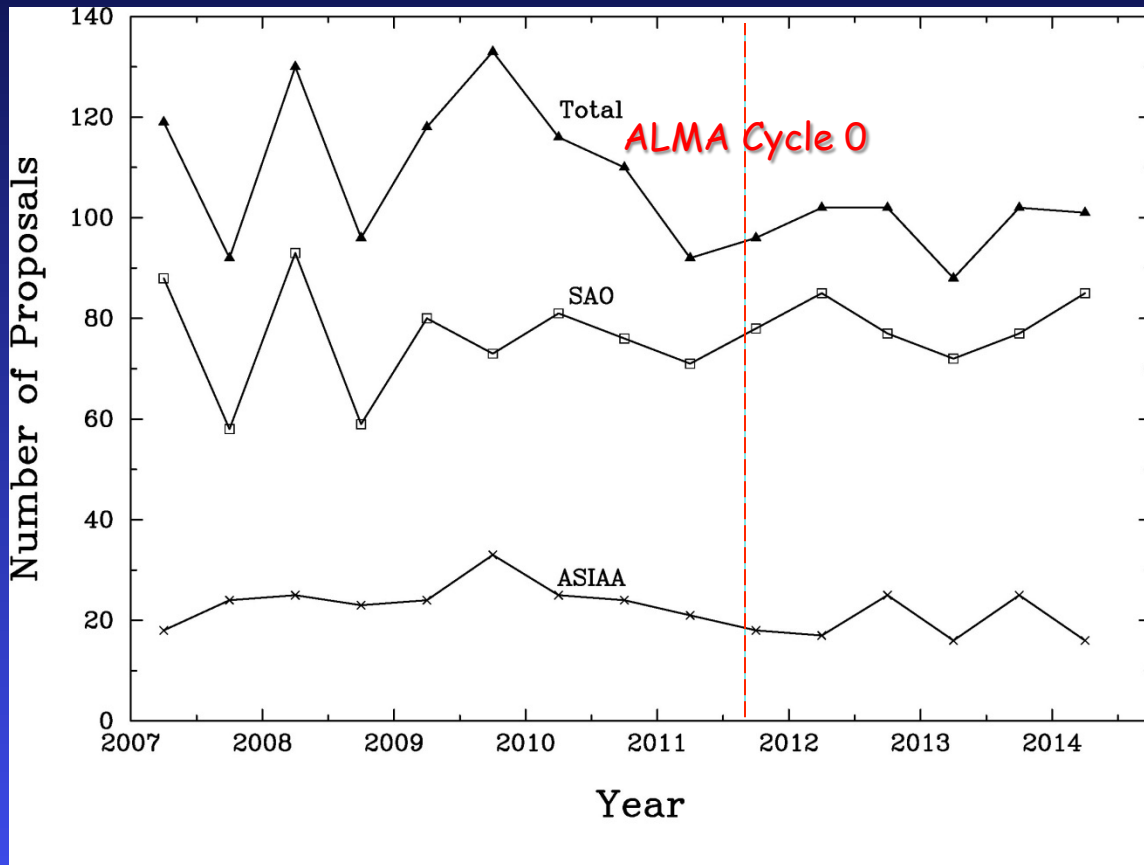
# Time Allocation I

- Observing time share among three institutions: SAO 72.5%, IAA 12.5%, UH 15%
- Since September 2008, IAA and SAO proposals are reviewed and ranked by a single TAC, but time allocation is separate. Since 2011B, time allocation is based on a single ranking.
- Proposals reviewed by members of TAC (9-13 members) consisting of scientists from SMA, IAA, CfA, and outside community.
- UH runs a separate TAC on UH time share

# Time Allocation II

- Each proposal reviewed by 4-6 TAC members;
- Proposals ranked, discussed and reevaluated at face-to-face meeting at CfA (next one in September).
- TAC Chair uses rankings to determine rough configuration schedule to best accommodate highest ranked proposals (including partners) . Final allocation with Director's approval.
- Proposals are rated by the TAC as
  - ◆ A: highest rating, executed on a best effort basis
  - ◆ B: middle rating, to be executed as time permits
  - ◆ C: lowest rating, will not be executed

# No. of Proposals from SAO+IAA 2007-2014



# of proposals: **1597** (106 per semester)

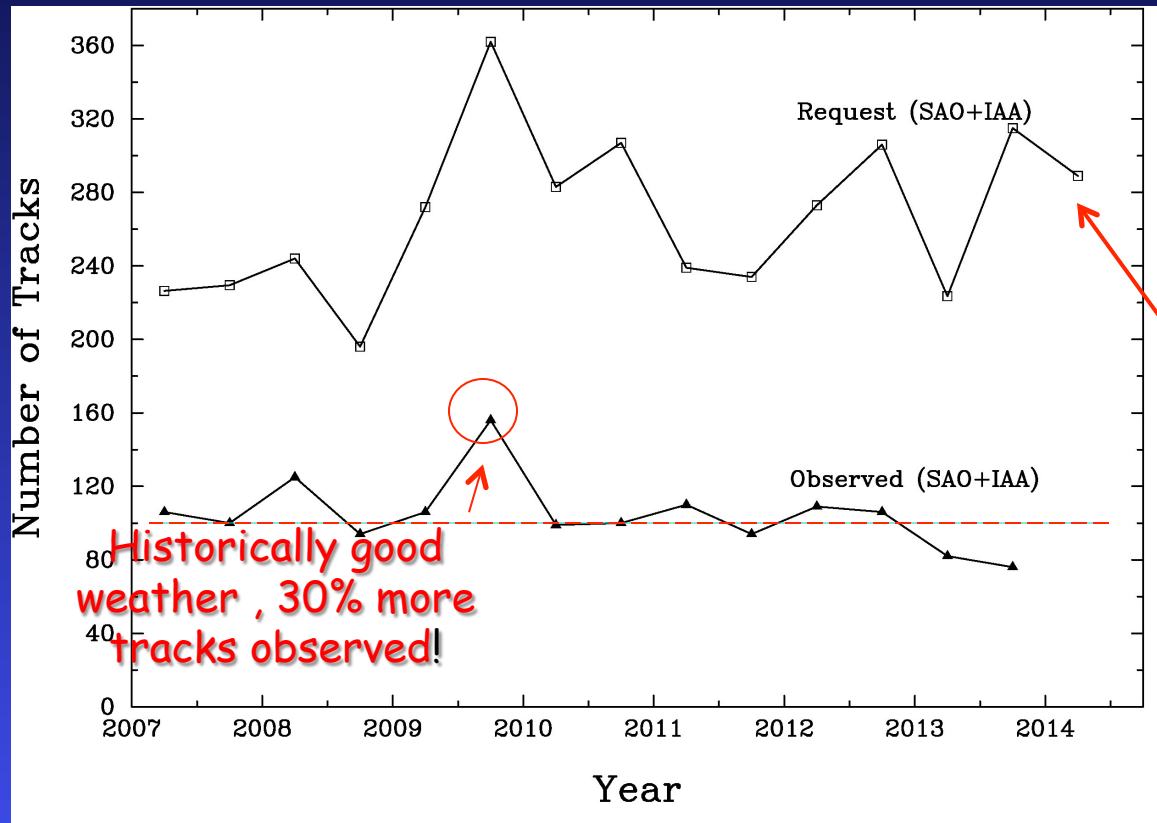
No. of unique PIs: **315**

SAO per semester: **58 - 93**

IAA per semester: **18 - 33**

UH: Only approved projects (10 per semester) enter in the system

# No. of tracks requested/observed from 2007-2014 (SAO+IAA only)



Requested (not including large-scale projects):  
**4000**

Observed: **1463\***  
\*through May 15, 2014

**Oversubscription: 1:2.7**

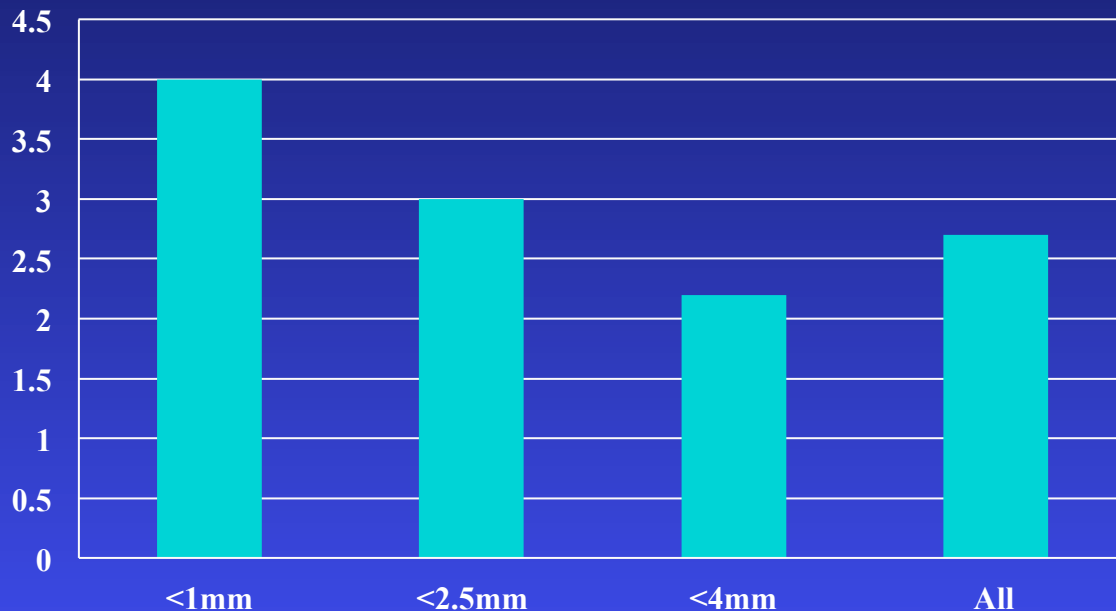
Current observing semester



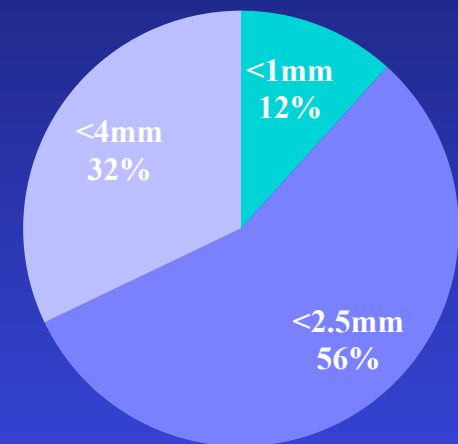
# Time Oversubscription

- Majority of time requests come at PWV < 2.5mm, normally reserved for 345 GHz

Oversubscription by Weather

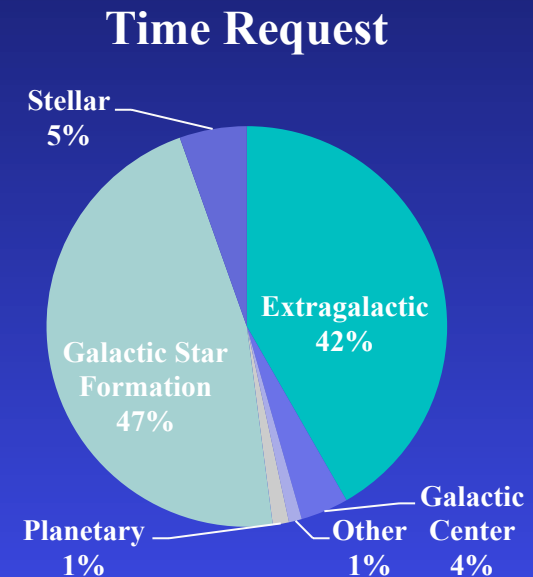
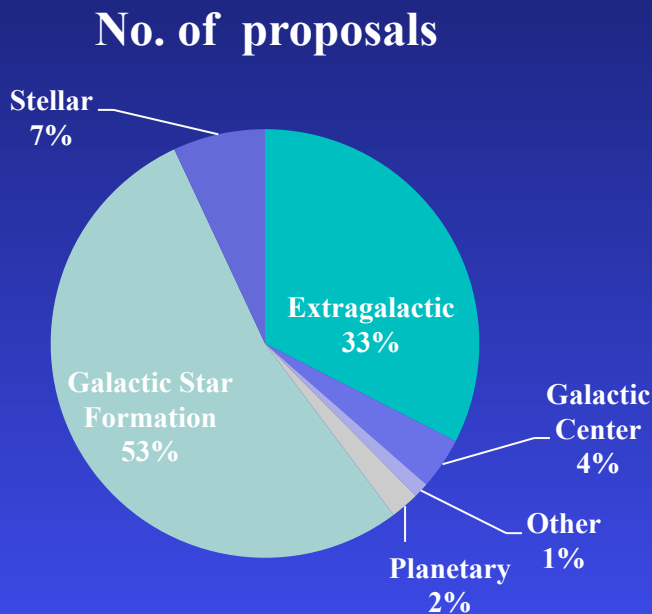


Time Request by Weather



# Proposals in science categories

- Galactic star formation and extragalactic science make up 86% of proposals, and are the main science drivers
- Extragalactic proposals (majority on submm galaxies) request more tracks per proposal



# Refereed publications

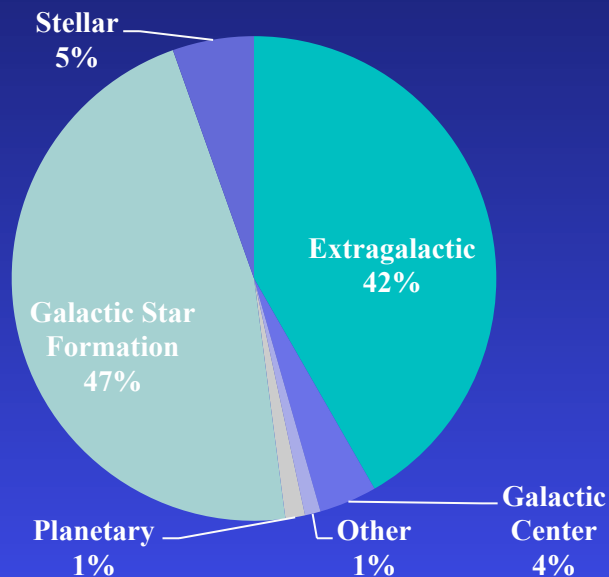
- Total of 516 refereed publications 2007- 2014
- 80 papers/year from 2010-2014, 1.5paper/week
- SMA observes ~ 100 proposals per year
- → 50% to as high as 80% projects result in publications



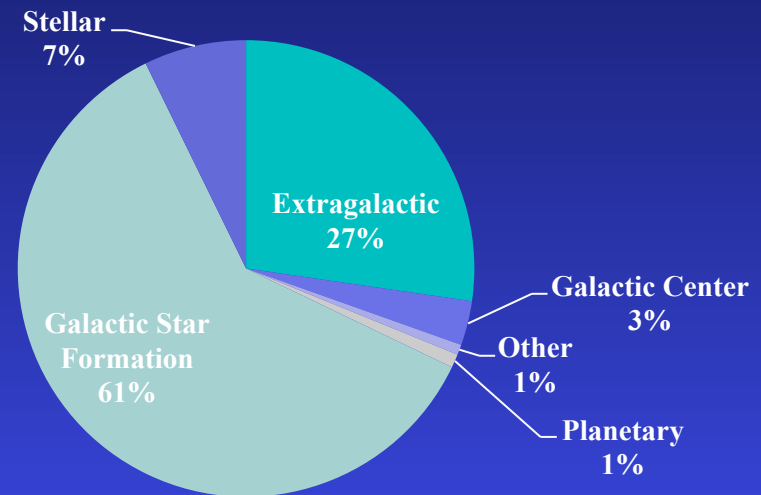
# Observing time and publications

- Extragalactic projects tend to require more observing time as compared to star formation projects

**No. of tracks observed**



**No. of Publications**



# Data Archive I

- Raw data archived in Hawaii and Cambridge
- Users obtain data through Radio Telescope Data Center (RTDC)
- SMA data have a proprietary period of 15 months
- Calibrated visibilities and images available to users from 2008

# Data Archive II

Searching for SMA Data - Mozilla Firefox

http://www.cfa.harvard.edu/rtdc/data/search.html

Radio Telescope Data Center  
Smithsonian Astrophysical Observatory

## Searching and Requesting SMA Data:

The RTDC provides raw, calibrated, and imaged data to Principal Investigators (PIs) and the wider astronomical community. At present, **a 15 month proprietary period is in effect**, which means that **non-PIs may only request data older than 15 months**, i.e., older than 2009 July 08.

Please note that the date of observation is encoded in the filename:  
/data/sma/science/mir\_data/yyyymmdd\*.

[PI Listings \(2006 - 2010\).](#)

### Raw Data

We maintain an SMA raw data archive from April 13, 2002 to the present\*. Raw data, i.e., correlator output, is in MIR format and may be requested and then calibrated and imaged using one or more of the [MIR](#), [MIRIAD](#), or [AIPS software packages](#).

### Calibrated Data

We maintain an SMA calibrated data archive from April 01, 2008 to the present\*. These data have been calibrated using the MIR software package and are available in either MIRIAD format (the default) or MIR format (by request to [aargon@cfa.harvard.edu](mailto:aargon@cfa.harvard.edu)).

[Sample MIR Calibration Script](#)

### Imaged Data

We have begun work on an SMA imaged data archive. When complete, users will be able to view or download representative plots (JPG format) or request full image cubes (FITS format).

[Sample MIRIAD Imaging Script](#)

[The Images](#)

### Conduct Search and Submit Request

[Instructions](#)

[Query Form](#)

# PhD Theses with Significant Amount of SMA Data\*

## Harvard Students (12)

Peter Sollins (2005)  
Dan Marrone (2006)  
Joshua Younger (2009)  
Meredith Hughes (2010)  
Robert Harris (2013)  
Meredith MacGregor (expected 2015)  
Katherine Rosenfeld (expected 2016)  
Ian Czekala (expected 2016)  
Christopher Faesi (expected 2016)  
How-Huan (Hope) Chen (expected 2016)  
Dawn Graninger (expected 2017)  
Ryan Loomis (expected 2018)

## Other Universities (3)

Joanna Brown (Caltech, 2008)  
Olja Panic (Leiden, 2009)  
Simon Bruderer (EHT Zurich, 2010)

## SAO Predocs and Visitors (23)\*

Junzhi Wang (Beijing, 2006)  
Aina Palau (Barcelona, 2007)  
Sheng-Li Qin (Beijing, 2008)  
Ramiro Franco-Hernandez (UNAM, 2009)  
Javier Rodon (MPIA, 2009)  
Luis Zapata (UNAM, 2010)  
Filipe Alves (Barcelona, 2010)  
Gemma Busquet (Barcelona, 2010)  
Cassandra Fallscheer (MPIA, 2010)  
Keping Qiu (Nanjing, 2010)  
Roberto Galvan-Madrid (UNAM, 2011)  
Vivian U (Hawaii, 2011)  
Lei Zhu (Beijing, 2011)  
Ke Wang (Beijing, 2012)  
Yuan Wang (MPIA, 2012)  
Hao-Yu Liu (ASIAA, 2012)  
Pau Frau (Barcelona, 2013)  
Xuejian Jiang (Nanjing, 2014)  
Katherina Immer (MPIfR, 2014)  
Siyi Feng (MPIA, expected 2014)  
Catherine McGuire (U Manchester, expected 2015)  
Xing (Walker) Lu (Nanjing, expected 2015)  
Tao-Chung Ching (Taiwan, expected 2015)

Of 14 PhDs (Harvard/SAO predocs), 7 are university faculty or obs. staff researcher.

\* Not including students at partner institutions (ASIAA and UH) unless they were SAO predocs

# Undergraduate Student Research and Postdocs

- Undergrad: SMA offers one of the experiments in Harvard Astronomy 191, Modern Astrophysics Laboratory, and produced 6 of the 7 class publications with Harvard undergraduate students.
- Postdocs: In addition to offering its own postdoc fellowship, SMA is a draw to other prize fellows (Hubble, NSF, Segan, Jansky, Einstein fellows)

**Course Information**

**Astro 191: Astrophysics Laboratory**  
**Prof. John M. Kovac**

Harvard College/GSAS: 3615  
Spring 2014; limited to 16

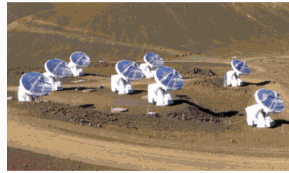
First meeting: **Friday, Jan 31, 2014**  
Location: [Observatory Building A Classroom](#)

Laboratory and observational projects in astrophysics, carried out with the research facilities of the Harvard-Smithsonian Center for Astrophysics. Students design and undertake two projects from a selection including: observational studies of the cosmic microwave background radiation, interstellar hydrogen, giant molecular clouds, the rotation of the Galaxy, Galactic molecular sources with the submillimeter array (SMA), and laboratory experiments including super-conducting submillimeter detectors, microwave spectroscopy, and hard x-ray imaging detectors and telescopes.

Intended primarily for concentrators in Astronomy and Astrophysics or combined concentrators with Physics. Students with Physics as their primary concentration, but with a serious interest in astrophysics, may take this to satisfy their laboratory requirement (in lieu of Physics 191) upon petition to the Head Tutor in Physics.

Prerequisite: Astronomy 16 or 17, or Physics 15c or equivalent.

**Experiments**



**Submillimeter Array**

**Recent Student Publications**

In some cases experiments in the course produce scientific results worthy of publication, and students are encouraged to continue working with their instructors to write a paper. Six recent publications of this sort are given below. Astro 191 student authors are in **bold**.

"Submillimeter Array High-angular Resolution Observations of the Monoceros R2 Star Forming Cluster", **M. Dierckx**, I Jimenez-Serra, V. M. Rivilla, & Q. Zhang, *Astrophysical Journal*, 2013, submitted. [paper](#)

"A New Recombination Line Maser Object Toward the MonR2 Hill Region", I Jimenez-Serra, A. Baer-Rubio, V. M. Rivilla, J. Martin-Pintado, Q. Zhang, **M. Dierckx**, & N. Patel, *Astrophysical Journal*, 2013, 764, L4. [paper](#)

"Arcsecond Resolution Mapping of Sulfur Dioxide Emission in the Circumstellar Envelope of VY Canis Majoris", **Fu, R.**, Moullet, A., Patel, N. A., **Bierstecker, J.**, **DeRose, K. L.**, & Young, K. H., *Astrophysical Journal*, 2012, 746, 42. [paper](#)

"Observations and Orbital Analysis of the Giant White Dwarf Binary System HR 5692", R. Stefanik, G. Torres, D. I. Iafem, W. I. Anderson, **N. Craig**, & J. Murrett, *Astronomical Journal*, 2011, 141, 144. [paper](#)

"Imaging Carbon Monoxide Emission in the Starburst Galaxy NGC 6000", S. Martin, **M. R. George**, D. J. Wilner, & D. Eschjeda, *Astronomical Journal*, 2010, 139, 2241. [paper](#)

"A Keplerian Disk around the Herbig Ae Star HD 169142", **A. Raman**, **M. Lisanti**, D. J. Wilner, C. Qi, and M. Hogerheide, *Astronomical Journal*, 2006, 131, 2290. [paper](#)

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# Outreach

- 1597 proposals from 2007-2014 with 315 unique PIs (over 50% from outside community).
- 516 refereed publications in the same period with over 1000 unique authors (64% of papers have CfA participation).
- Number of projects observed and number of publications suggest that on average 50% to as high as 80% of projects observed are published.

# Summary:

- SMA is a highly sought instrument among the mm/submm community.
- Science output from the SMA remains steady in the last 4 years, and compares favorably to other similar facilities.
- The main science output of the SMA is galactic star formation (61% publications) and extragalactic science (27% publications).

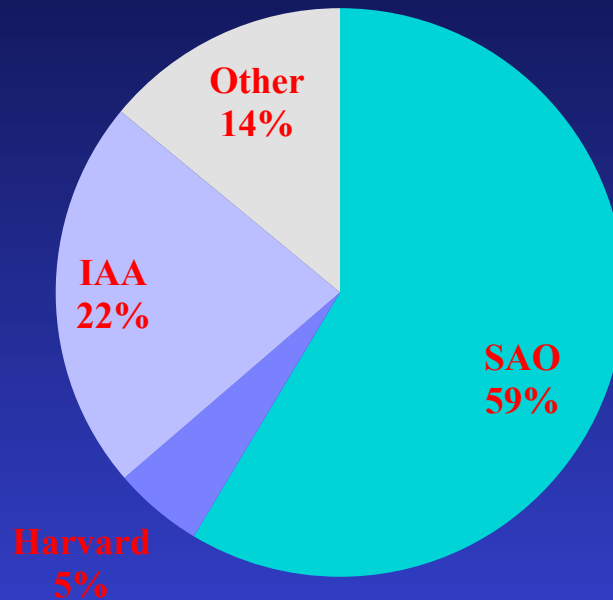


# Backup slides



# SMA publication by authors affiliation

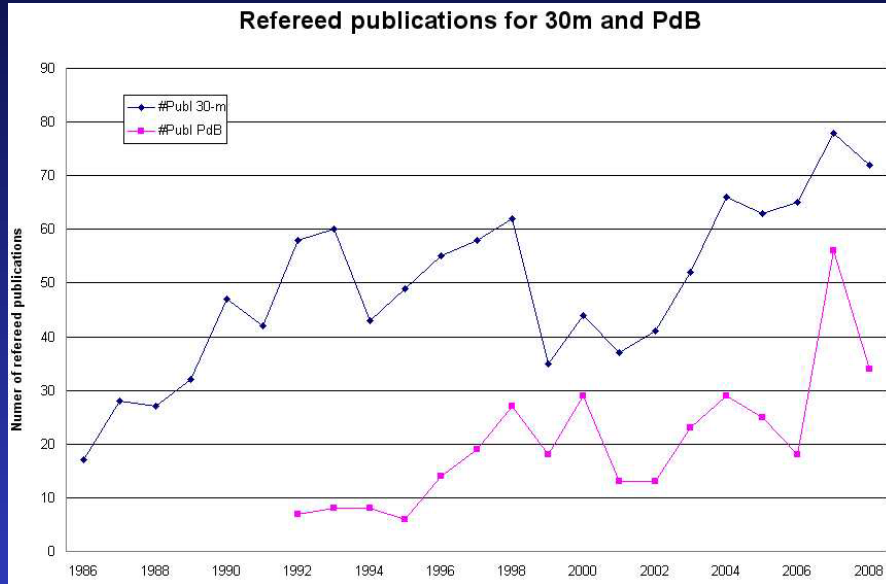
SMA publications 2010-2013



20% 1<sup>st</sup> authors from CfA

"Other": papers with no CfA nor ASIAA participation

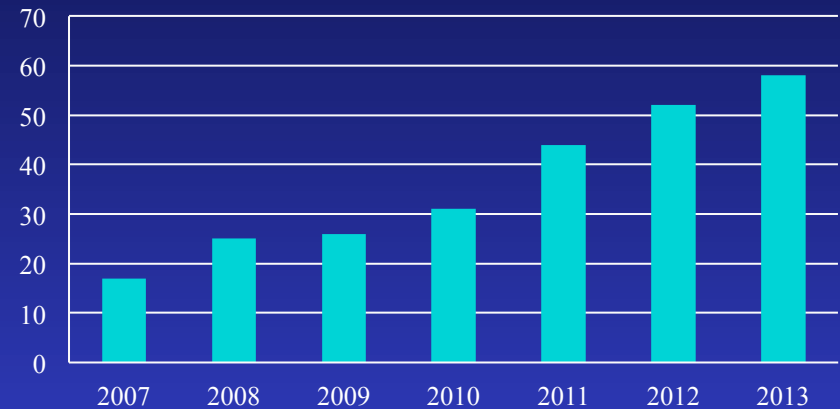
# Publications by other facilities



IRAM publications

Source: IRAM Newsletters 2009 Feb. issue

## CARMA BIMA/OVRO publications



CARMA publications

Source: <http://www.mmarray.org/>