Korea ALMA Project

http://alma.kasi.re.kr

2019. 2. 22

Ji-hyun Kang (KASI)

ALMA

Atacama Large Millimeter/submillimeter Array

- ☆ News
- ☆ East-Asia ALMA Science Workshop 2017 - Korea
- ○ Instrumentation
- ○ Korea-ARC Node
  - Events
  - Computing Facilities
- ○ People Korea
  - ALMA staff KASI
  - ALMA staff Univ.
- ○ ALMA Archival Science
- ○ Call for proposals
  - Proposal Preparation
  - Previous Proposal Calls
- ○ Publication

Announcements

2018-December-19

ALMA Cycle 7 Pre-Announcement

The Joint ALMA Observatory (JAO) will start the next cycle of observations (Cycle 7) in October 2019. A Call for Proposals (CfP) with detailed information on Cycle 7 will be issued in March 2019, with a deadline for proposal submission in April 2019. This pre-announcement highlights aspects of the Cycle 7 proposal Call that are needed to plan proposals.
More information of Cycle 7 pre-announcement is available in the ALMA science portal

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Announcements

2018-December-10

Korea-Japan F2F Meeting for ALMA/ASTE Developement



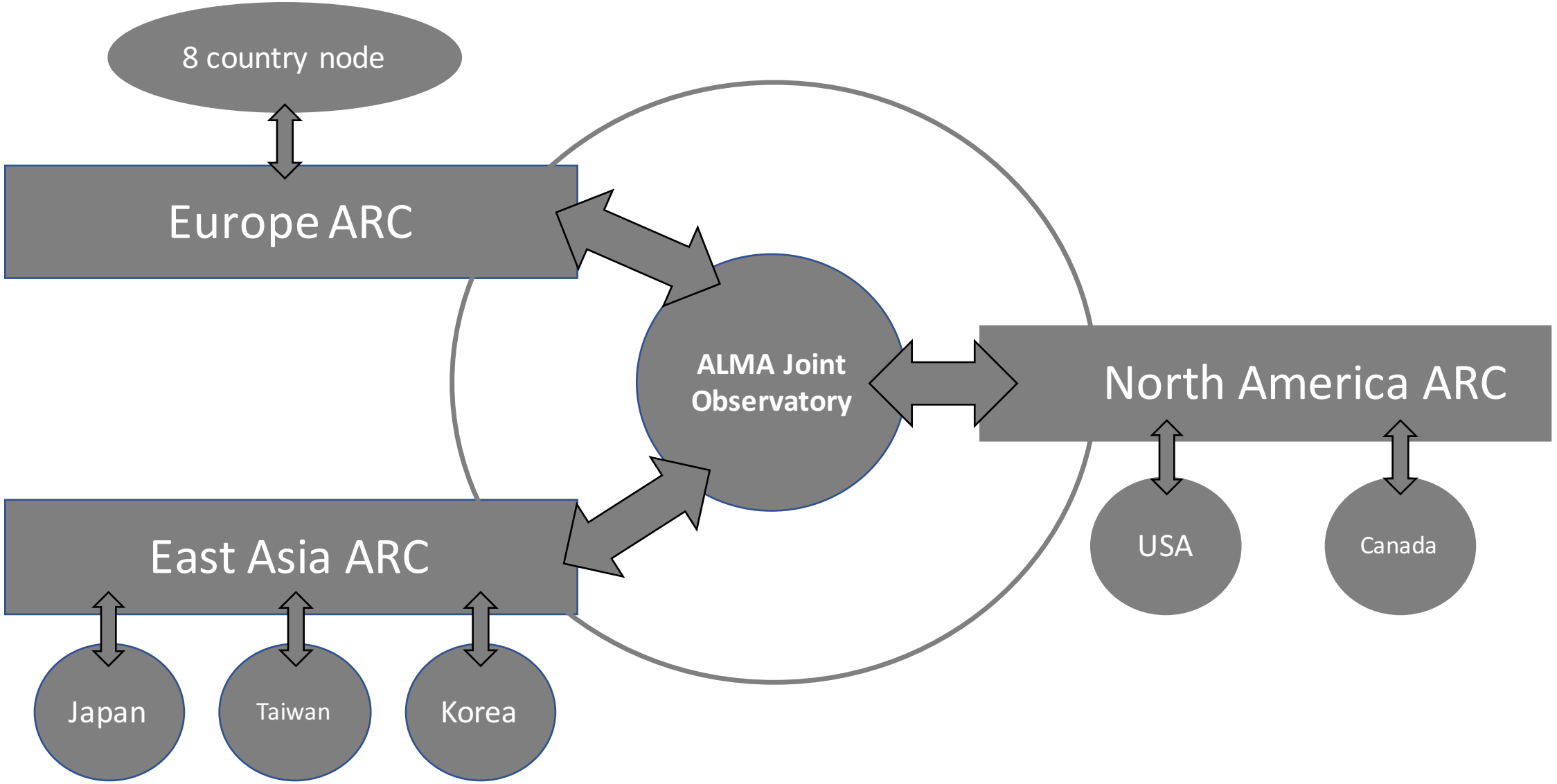
KASI has been developing a wide band ALMA receiver covering the frequency range of the ALMA band 7 and 8 (275 to 500 GHz) since 2015 in cooperation with the NAOJ. The GPU spectrometer also has been developed as a backend of

Atacama Large Millimeter/Submimllimter Array

- 12m array: 50 x 12m antennas
- ACA array: 12 x 7m antennas + 4 x 12m antenna
- Longest distance between two antennas: 16 km
- Operating wavelenghts 0.35mm – 3.1mm
- Max. angular resolution~20 mas, FoV~ 20” @ 300GHz



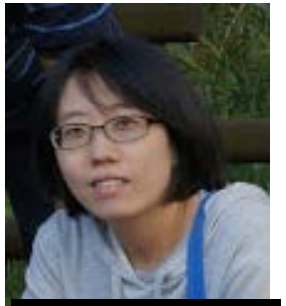
Structure of the ALMA Regional Center (ARC)

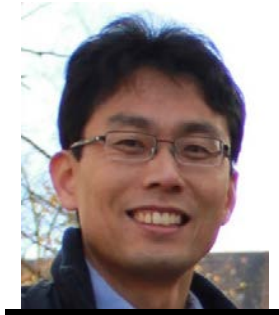


People working on the ALMA project


Jongsoo Kim


A-Ran Lyo


Jihyun Kang

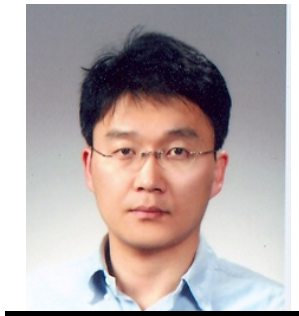

Woojin Kwon


Se-Heon Oh

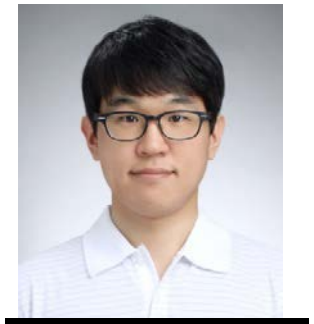

Kijeong Yim


Sujin Kim

Support for ALMA proposal preparation
P2G (observational script)
QA2 (data reduction)
AoD (QA0+1; operation on site)


Jung-Won Lee


Do-heung Je


Bangwon Lee


Hyunwoo Kang

Multi-beam receiver covering Band7+8

Korea-ARC Activities

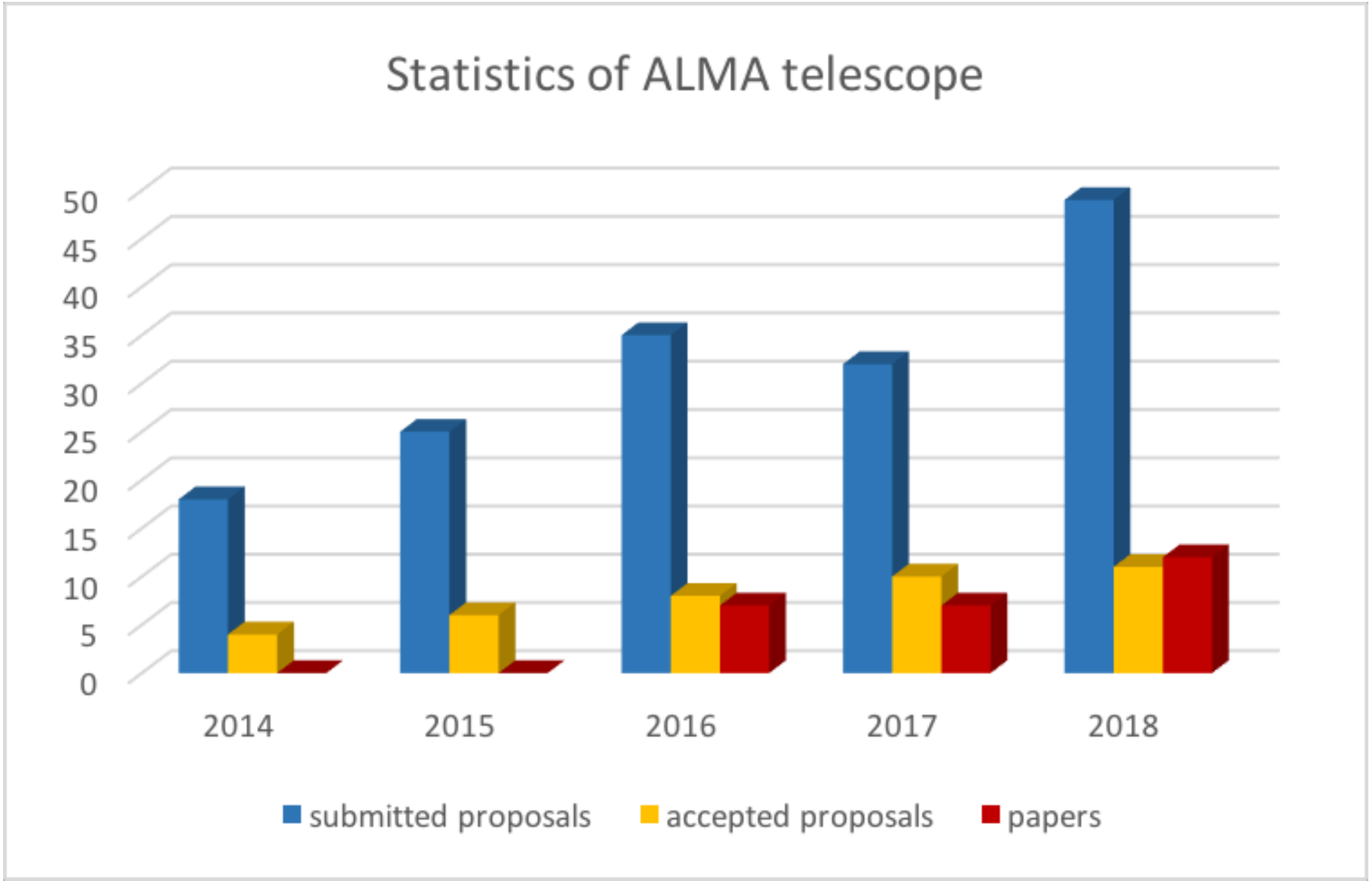
1. Town meetings: SNU (7,12/March), KIAS (22/March), KASI (27/March)



(SNU, 7,12/March,2018)


(KIAS, 22/March,2018)


(KASI, 27/March,2018)


Statistics of ALMA telescope
50
45
40
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
submitted proposals
accepted proposals
papers

Korea-ARC Activities

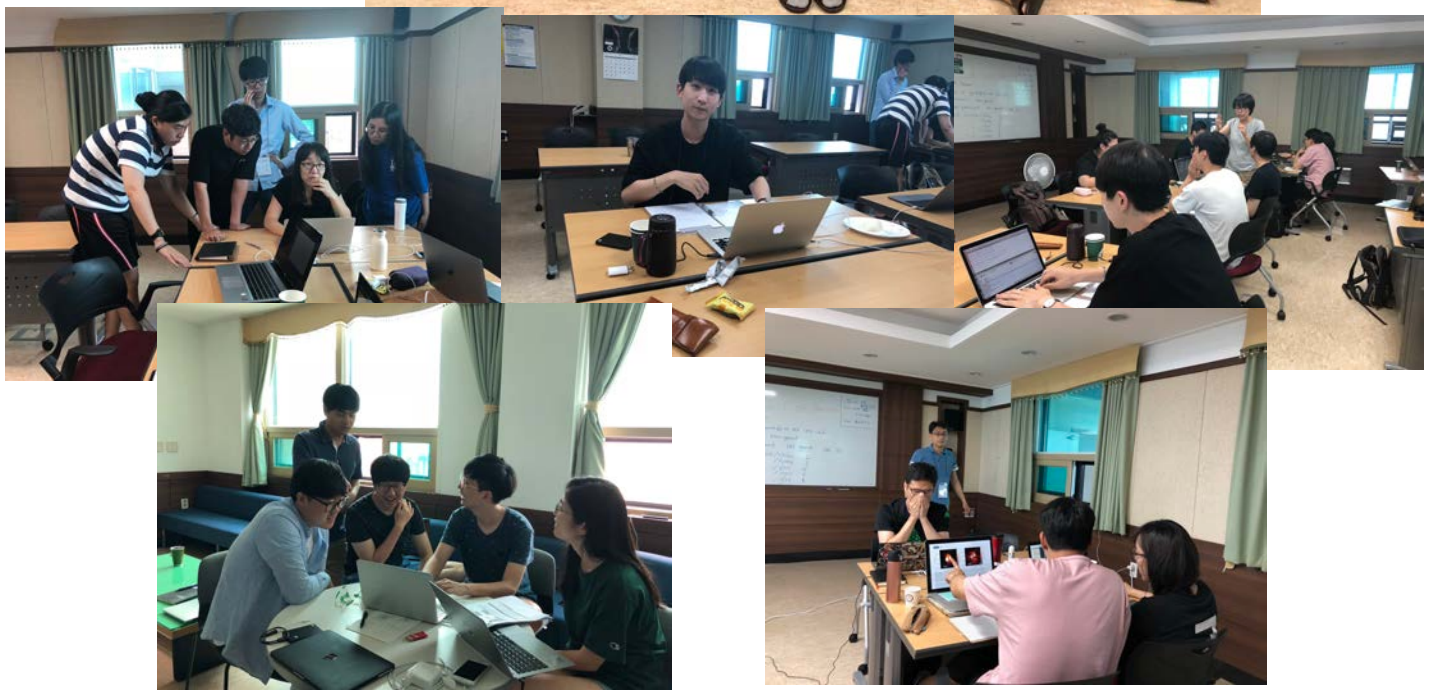
2. ALMA Summer School (23-27/July, 2018)

- Where: Sobaeksan Observatory
- Participants: 16 under- and graduate students
- Contents
  : basics of the Interferometry lecture
  : ALMA Data reduction tutorial of Image using TW Hya data
  : 5 group works using 5 different ALMA Archive Data





Lecture of the basics of the Radio Interferometry

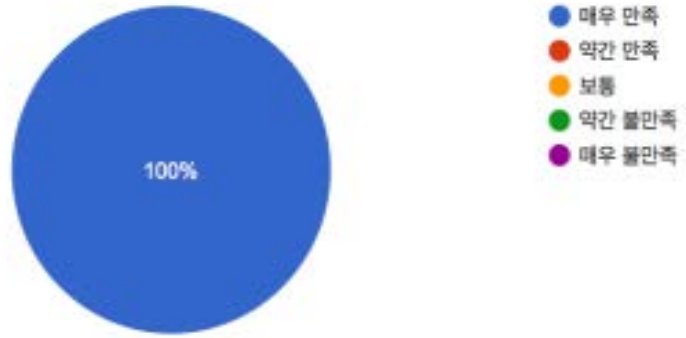


5 groups works using the ALMA Archive Data

Survey

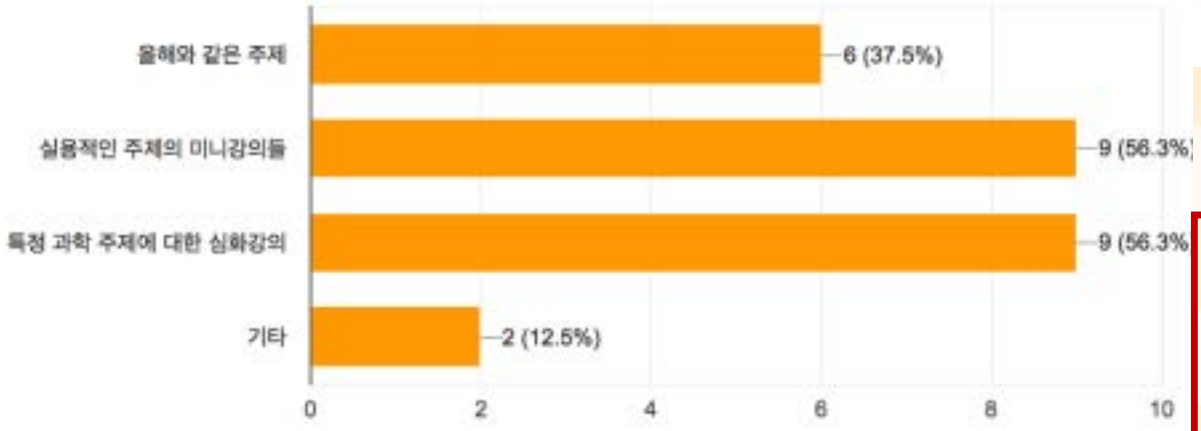
식사 및 간단만찬(?)에 어느정도 만족하셨습니까?

응답 16개



다음 ALMA 여름학교의 주제로 다루었으면 하는 주제를 골라주세요

응답 16개



여름학교 주제와 관련하여 아이디어나 운영진에게 전하고 싶은 것이 있으면 적어주세요

응답 16개

. (2)

이미징과 분석을 주제로 한 번씩, 두 번을 한 사이클로해서 하면 좋을 것 같습니다.

앞으로도 좋은 여름학교 진행해주세요. 감사

ㅁ

학생이 필요한 박사님들이 있으신거 같은데 학부학생도 참여하니 학생과 박사님이 연결되는 좋은 기회인것같습니다. 그리고 여기서의 작업으로 논문도 작성할 수 있으면 좋겠습니다.

이번 알마 여름학교 주제는 정말 좋았습니다. 논문에서만 보던 그림들을 실제로 만들어봐서 정말 유익했습니다.

충분히 적절한 주

ALMA를 활용한 연구하는 학생들에게는 매우 좋은 기회였을 것으로 생각됩니다.

ALMA에 대한 school이 2-3년정도 진행된 후 다른 (optical or IR 등) 분야와의 collaborated school이 열릴 수 있다면 조금 더 다채롭고 재미있는 school이 합니다.

이론수업과 . 따라서 앞으로도 저희가 직접 데이터를 다뤄볼 수 있는 주제들이 계속 이

수업자료 전에 미리 보내줬으면 합니다.

음.. 주제는 지금도 적절해 보입니다. 더 나아가면 한 해는 지금같은 기초 강의, 그 다음해는 좀더 심화적인 주제로, 이런 식으로 돌아가면서 하시면 더 재미있을 수도 있을 것 같습니다.

"이론+간단한실습"과 "실전"과 신대로 ALMA학교에서 Paper

Introduction about ALMA and examples of science study using ALMA in the past are also interesting. Student can see overview of the ALMA performance and get more ideas for future works.

1년에 두 번 하게 된다면 첫번째는 기초 개념과 실습, 두번째는 심화과정으로 archive 데이터로 논문 수준의 연구를 해본다면 좋을 것 같습니다.

Good & excellent !

Combined school with Optical & Infrared

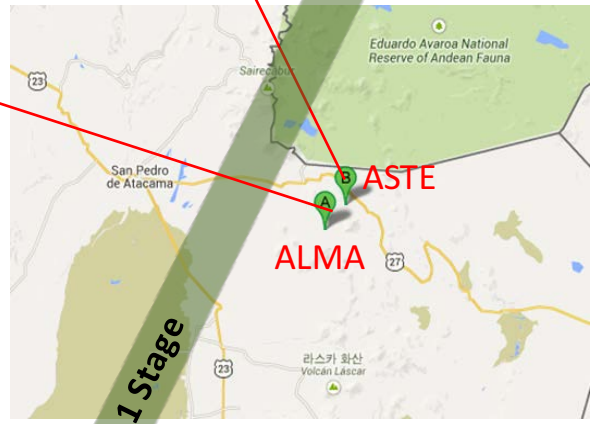
Twice per year

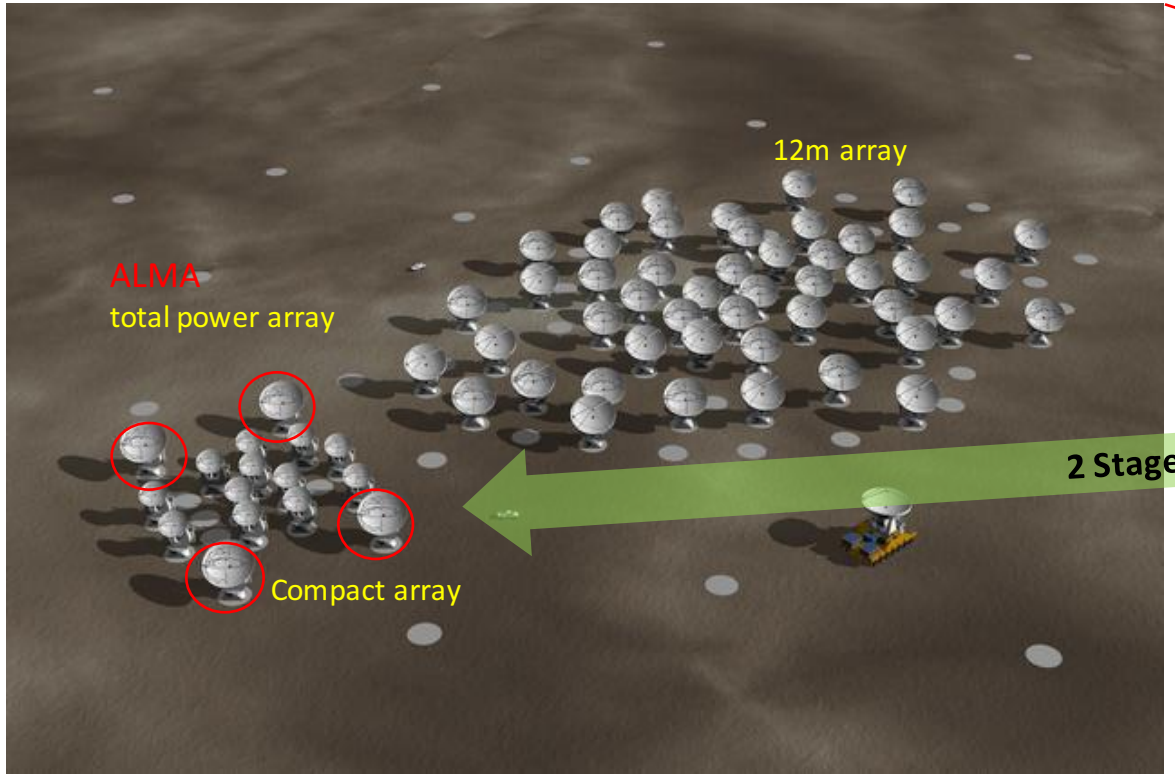
More deeper class, so then produce a paper

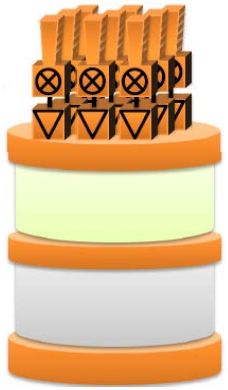
Receiver Development

- 2015-2019: ASTE single beam receiver covering 275-500 GHz
- 2019-2020: ASTE multi-beam receiver
- 2021-2024: ALMA multi-beam receiver
- 2015-2020: ASTE, ALMA GPU Spectrometer







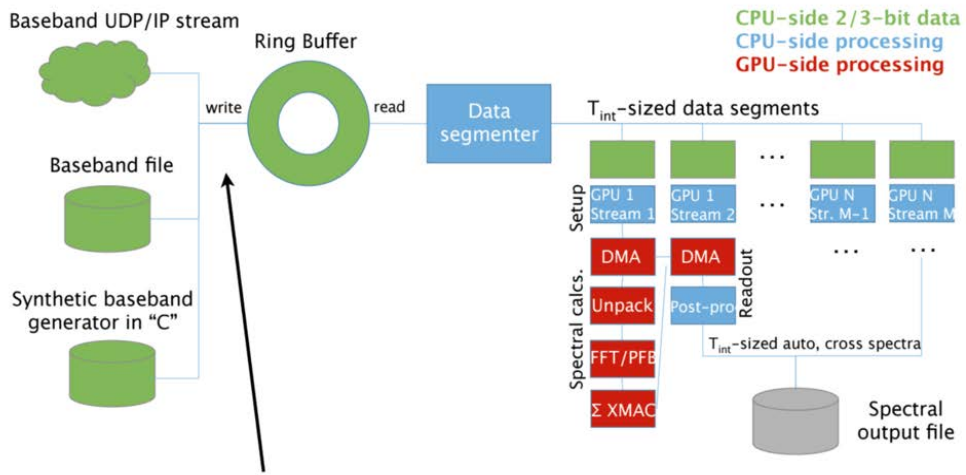




1. Back-end: GPU spectrometer

ALMA spectrometer specification

IF bandwidth	2 GHz x 2 (pol) x 4 (windows) x 4 (antennas)
input data rate	64 GHz x2 (Nyquist sampling) x 3 bits = 384 Gbps support higher bits sampling
output products	auto-, cross-correlation for single/dual/full polarization
minimum integration time	1 msec
max. data output rate	16 MB/s



ALMA Board Approved Development of New Spectrometer for Morita Array

19 January, 2018



A group of antennas of the Morita Array in ALMA. Credit: ALMA (ESO/NAOJ/NRAO)

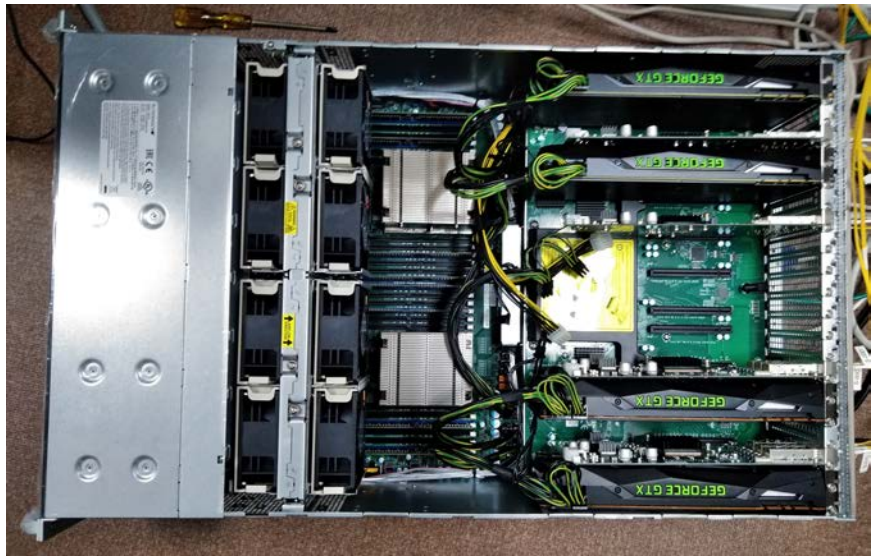
In November 2017, the ALMA Board approved the development of a new spectrometer for the Morita Array designed and developed by Japan for the ALMA telescope. The development will be undertaken by Korea Astronomy and Space Science Institute (KASI) and the National Astronomical Observatory of Japan (NAOJ) as part of the ALMA Future Development Program aiming to keep ALMA continuously producing remarkable scientific results for the future.

A principle investigator of the ACA spectrometer project, Jongsoo Kim, said: "The approval of the ACA spectrometer project by the ALMA board is a recognition of the cost-effective development plan and the successful collaboration between KASI and NAOJ." He also added that "An ACA spectrometer will become the first instrumental contribution to the ALMA community from Korea through the East Asia partnership."

2018 development: **GPU spectrometer**

- ASTE GPU spectrometer :

GPU server & pre-production DRXP board

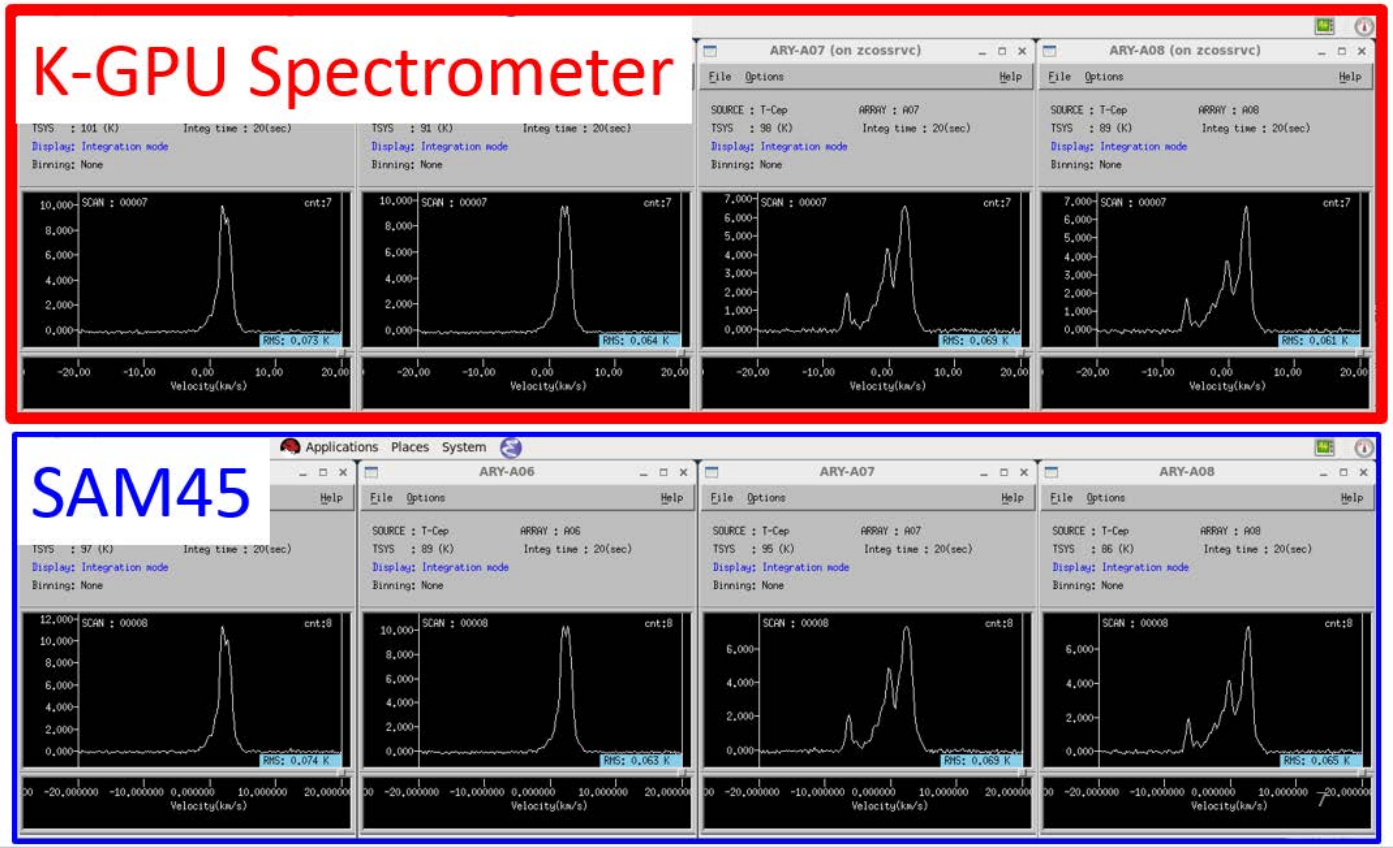




Spectra using Nobeyama 45-m Telescope

SiO (v=2, J=1-0) @ 42.8GHz

SiO (v=1, J=1-0) @ 43.1GHz



performance comparison bt. GPU spectrometer & SAM45 digital autocorrelator

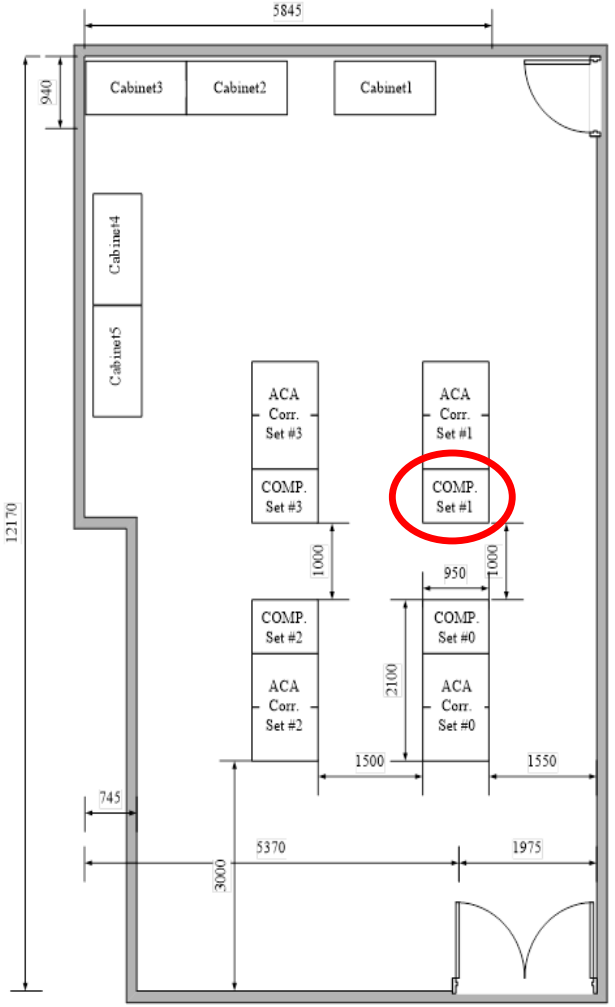
2018 development: **GPU spectrometer**

- GPU spectrometer test at ALMA : installed in ACA correlator room



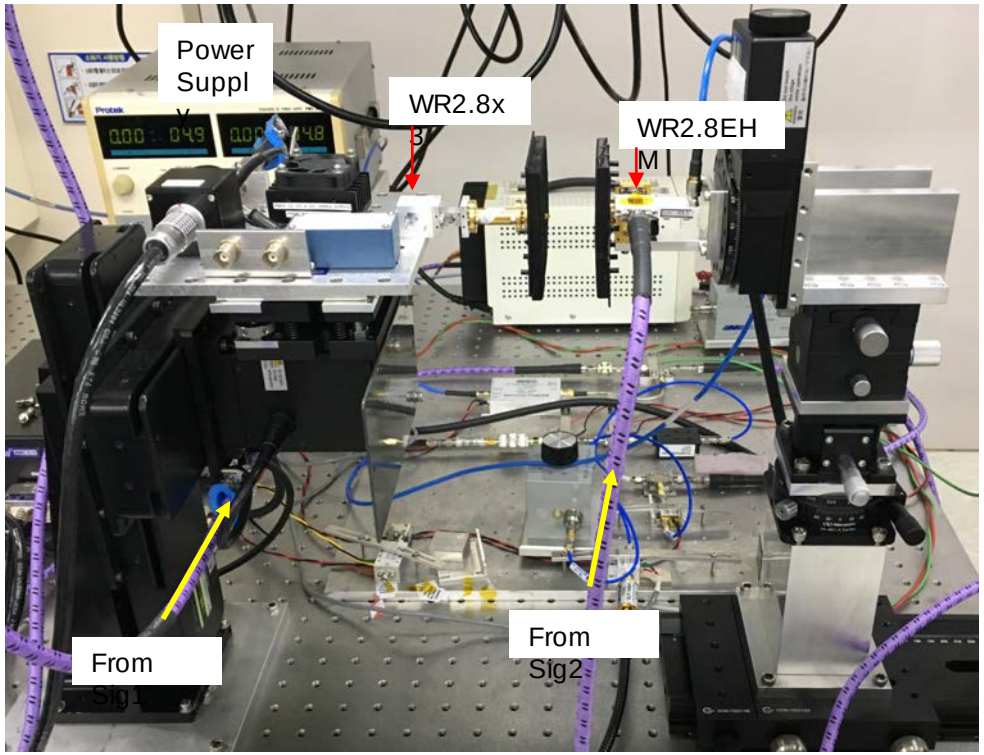


GPU Server (SuperMicro SYS-4028GR-TRT) with two TITAN X, two GeForce GTX TITAN X and two prototype DRXP

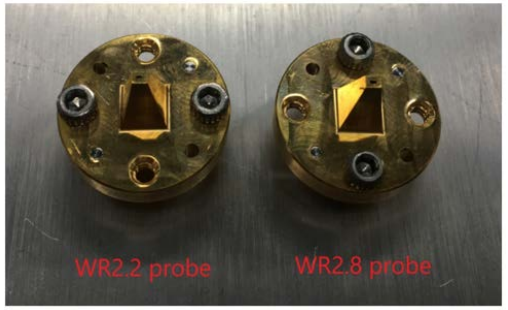


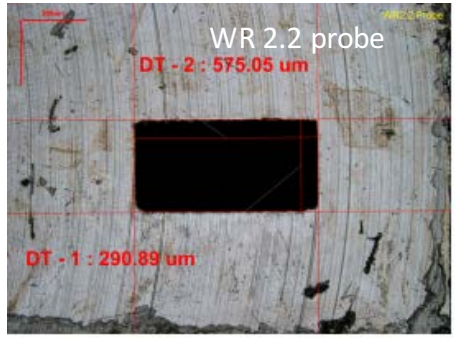
2. Front-end: ASTE b7+8 receiver

Beam measurement system







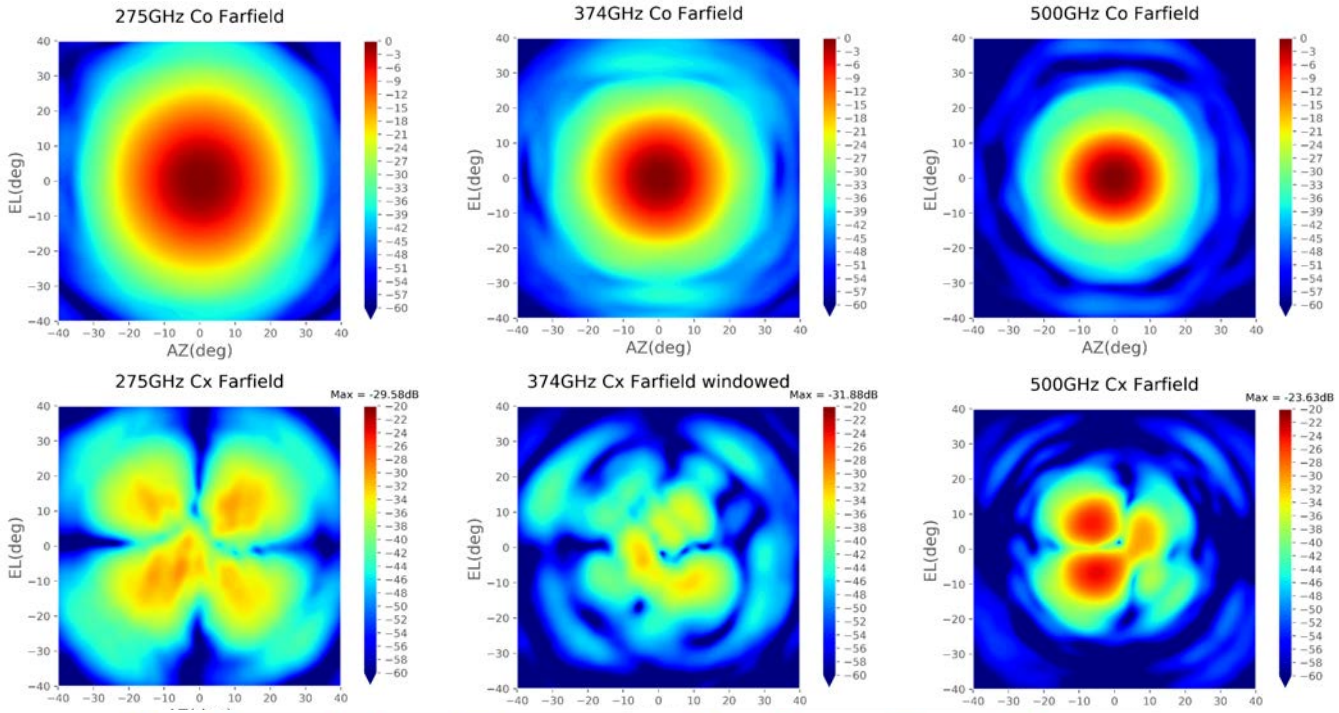


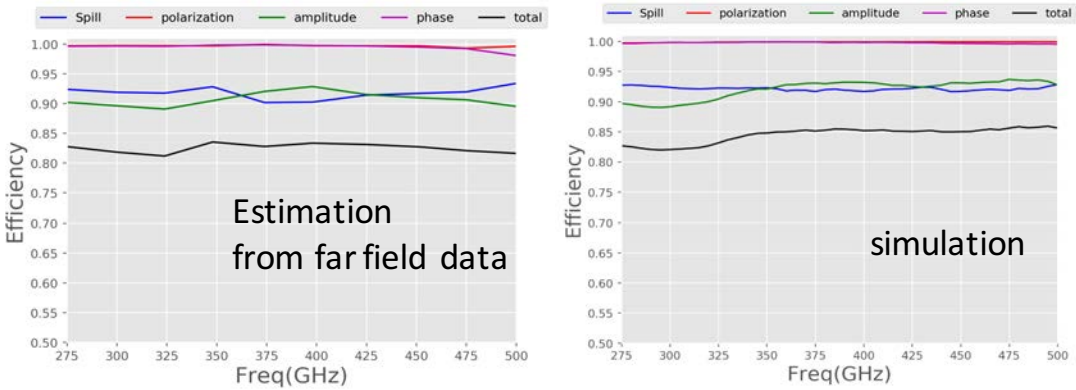
- vector near-field beam measurement system
- 70 dB dynamic range
- translation/rotation stage
- OTF scanning capability/script control
- near-to-far field transformation by post processing

2018 development : **ASTE b7+8 receiver**

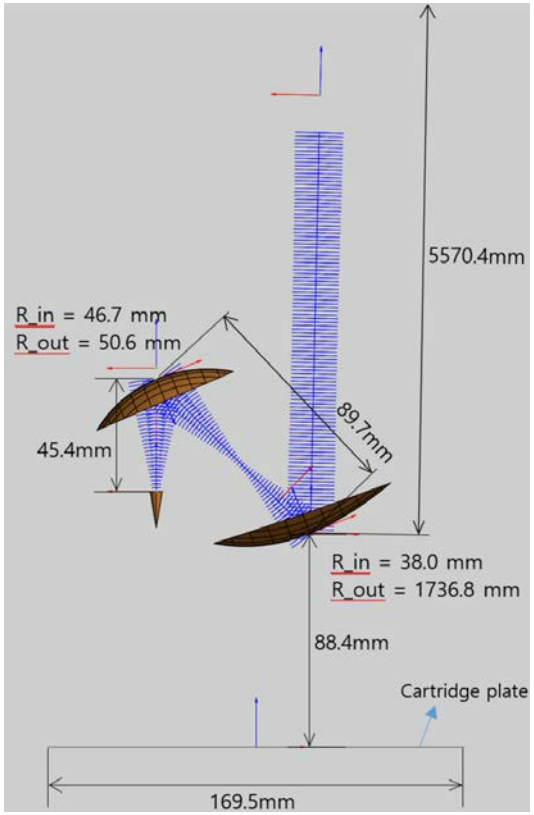
Aperture efficiency estimate

- Calculated far field from near-field data



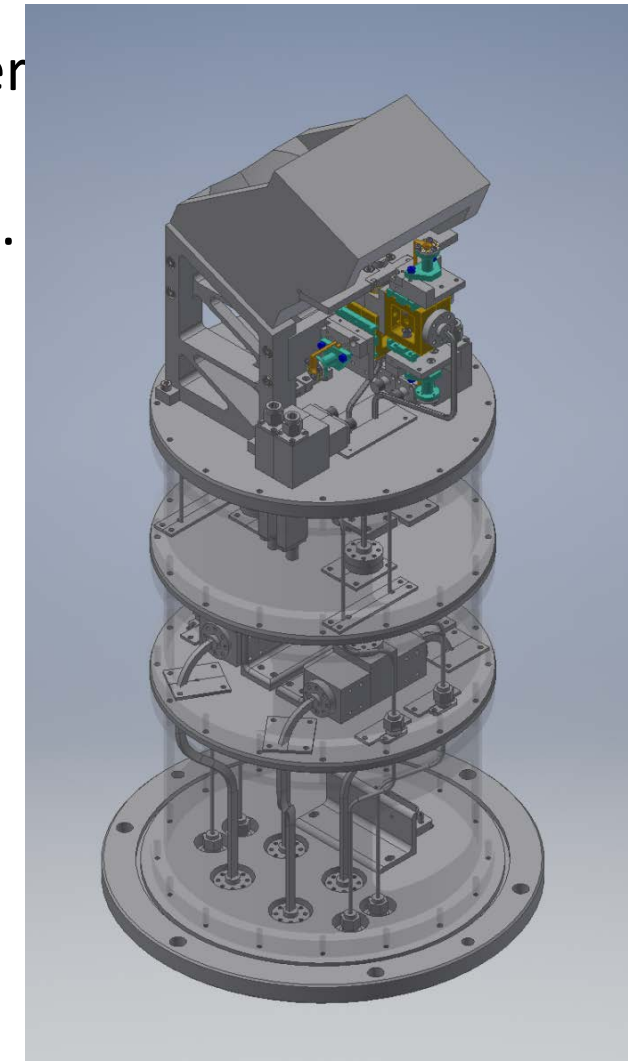


Receiver optics for ASTE 10 m telescope



Receiver Development Summary

- Critical components (mixer, 2SB unit, horn, LO diplexer OMT) for b7+8 are ready.
- Cartridge design/fabrication/test will be done in 2019.



Milestones

(Phase I)

2019 April : internal PDR, spectrometer CDR

2019 July : completion of test of b7+8 cartridge receiver

2019 August: PAI report submission

Science Highlights

Below is a table of ALMA Science Highlights

1. Possible Disk Truncation in Ophiuchus Brown Dwarfs
2. Observing the Sun with ALMA: fast-scan single-dish mapping
3. Molecular Gas Within the Supernebula of NGC 5253
4. Detection of a z~6 Starburst Galaxy with the ALMA Spectral Scan Mode
5. 1000th ALMA paper - Spatial variations in Titan's atmosphere temperature
6. An ALMA Detection of Oxygen from a z=9 Galaxy

- ALMA Archive

ALMA CYCLE 7

The Joint ALMA Observatory (JAO) will start the next cycle of observing (Cycle 7) in 2019. A Call for Proposals with detailed information on Cycle 7 will be issued in March 2019, with a deadline for proposal submission in April 2019. ALMA Cycle 7 will start in early October 2019 and span 12 months. It is anticipated that 4300 hours of 12-m Array time will be available for successful observations of approved projects, and 3000 hours will be available on the Atacama Compact Array (ACA), also known as the Morita Array.

21 March 2019
Townhall meeting at KASI

KEY DATES

19 March 2019
Release of the ALMA Cycle 7 Call for Proposals and Observing Tool, and opening of archive for proposal submission

17 April 2019
Proposal submission deadline

End of July 2019
Result of the proposal review sent to proposers

September 2019
- Submission of Phase 2 by Proposers
- Release of ACA Supplemental CfP*

October 2019
- Start of ALMA Cycle 7 observations
- Close of ACA Supplemental CfP*

2019 2020

September 2020
End of Cycle 7 observations

* Expected dates