ALMA Korean Node Activities

TPGS (5)

Jongsoo KIM

Jongsuk HONG

Heesun YOON

Won-Kee PARK

Yaocheng CHEN

Receiver (2)

Bangwon Lee

Do-Heung JE

ARC (9)

A-Ran LYO

Seokho LEE

Jihyun KANG

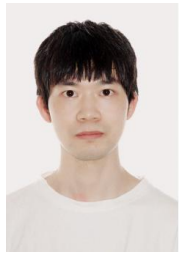
Min-Young LEE

Yusuke ASO

Gyueun PARK

Yuqiang LI

Bo HUANG



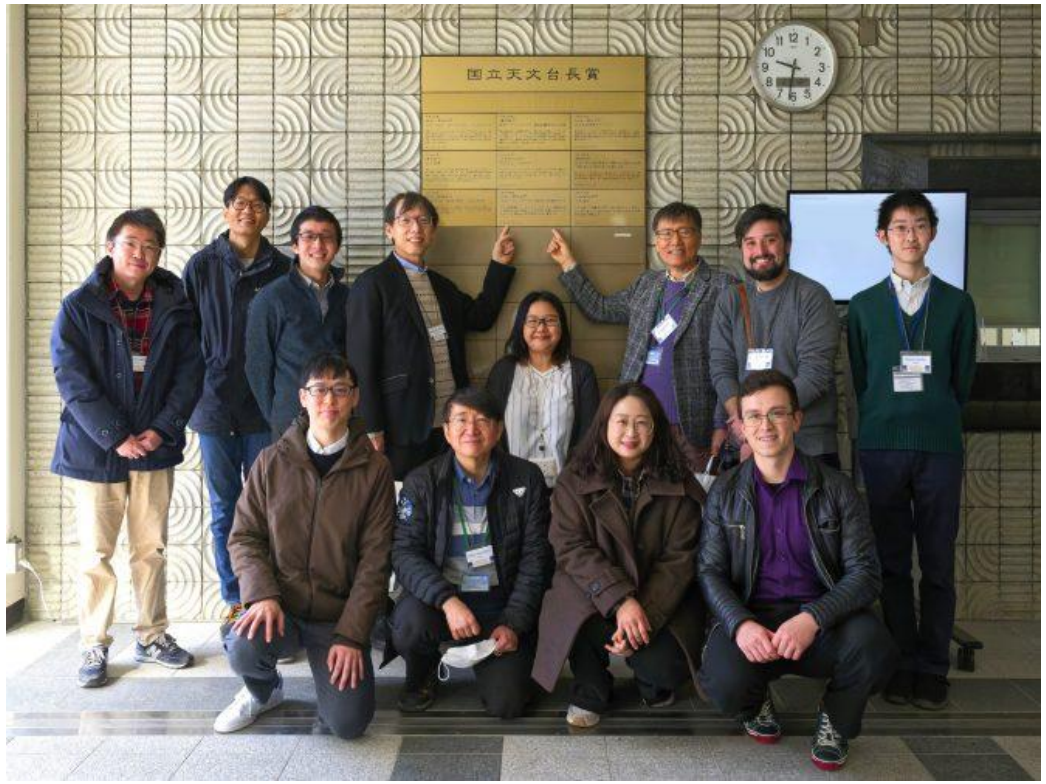
Hee-Won YI

Renewal of MoU between NAOJ and KASI (Oct. 23 2025)

NAOJ Director General Mamoru Doi (left)
and KASI President Jang-Hyun Park (right)

NAOJ Director General Mamoru Doi,
NAOJ ALMA Project Director Satoru Iguchi,
NAOJ Acting ALMA Program Manager George Kosugi

ACA Total Power Array Spectrometer Development Team Receives NAOJ Director General's Award (25/03)



KASI: Jongsoo Kim, Jongsuk Hong, Won-Kee Park, Heesun Yoon

NAOJ: **Takashi Nakamoto**, Manabu Watanabe, Susumu Nakayama, Makoto Shizugami, Isaac Goicovich, Shinya Ikebe, Camilo Saldias

Upgrade ALMA Band 8v2 Receiver

- Expand IF bandwidth : 4-8 GHz -> 4-16 GHz (up to 18 GHz)
- improve and flatten the receiver noise performance and IF power density slope across the full RF and IF ranges
- improve optics performance including cross-polarization and aperture efficiency

Do-Heung JE

LO AM noise verification

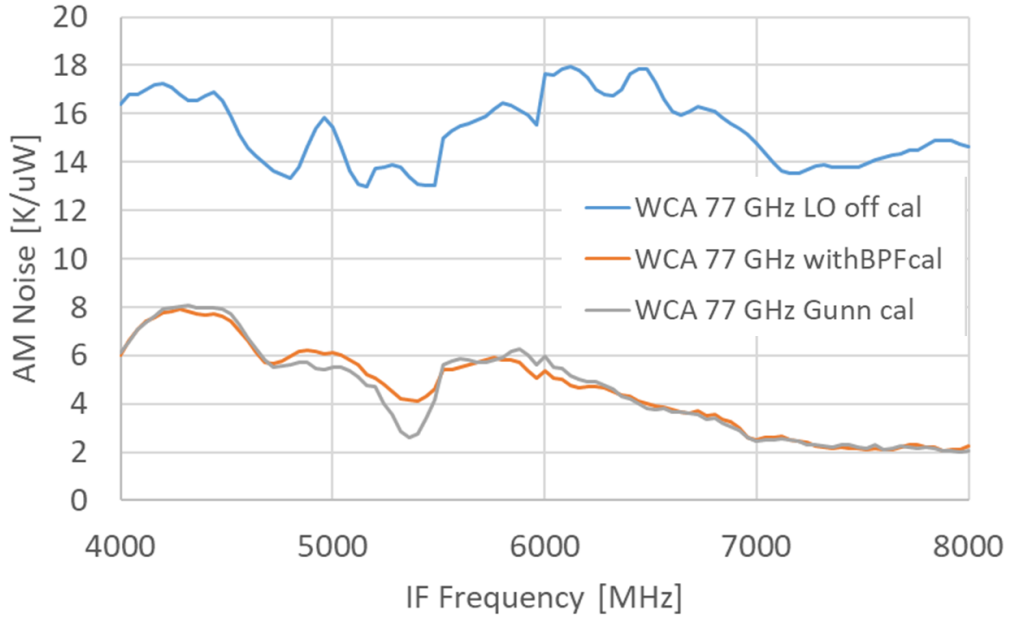
Bangwon Lee

Beam Measurement Setup

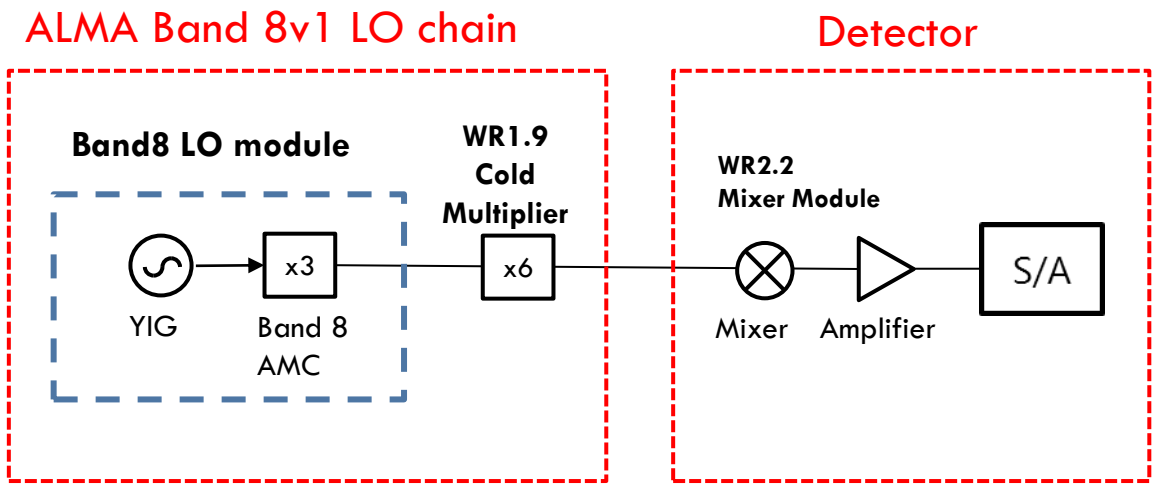
LO: Local Oscillator AM: Amplitude Modulation

LO AM noise verification

- AM noise measurement in ALMA LO chain
  - AM noise in LO signal increases the receiver noise temperature
  - The verification of LO module for ALMA Band 8v1 is on going
  - Gunn oscillator was verified and will be used as reference source in

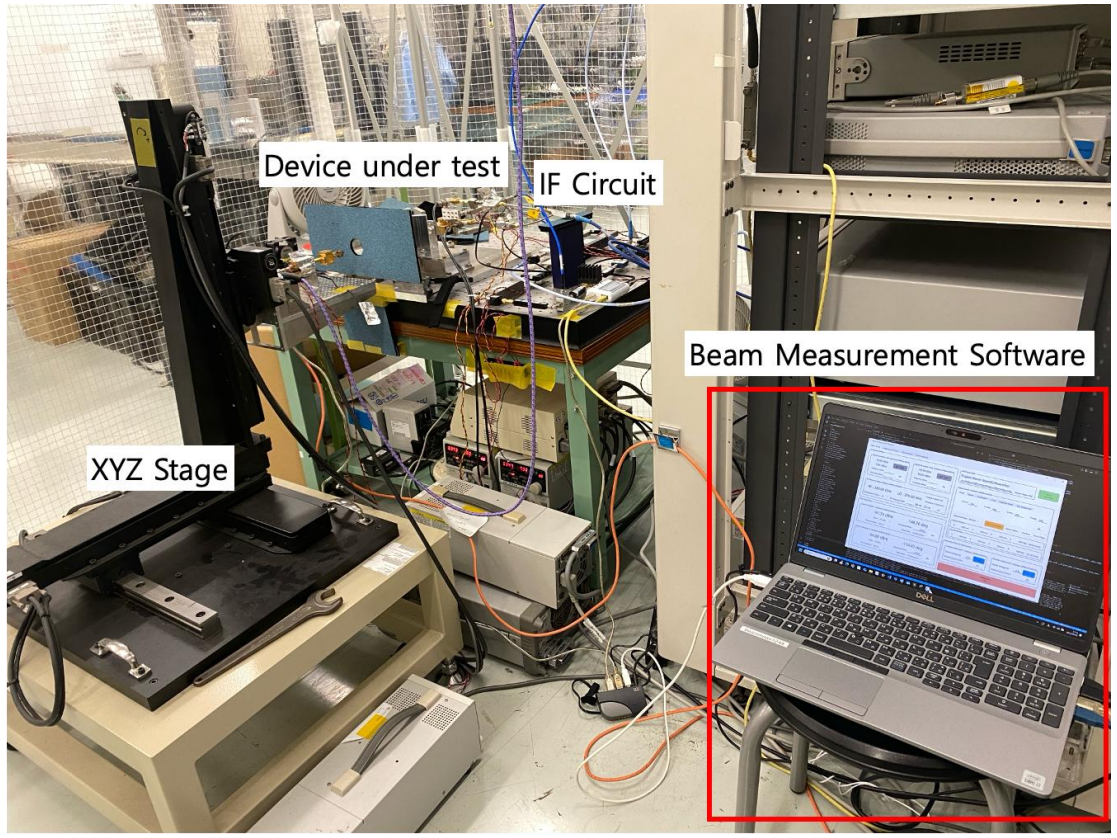


Measured AM noise at 462 GHz by reference sources



AM noise measurement configuration

Beam Measurement Setup



Beam Measurement Setup (NAOJ)

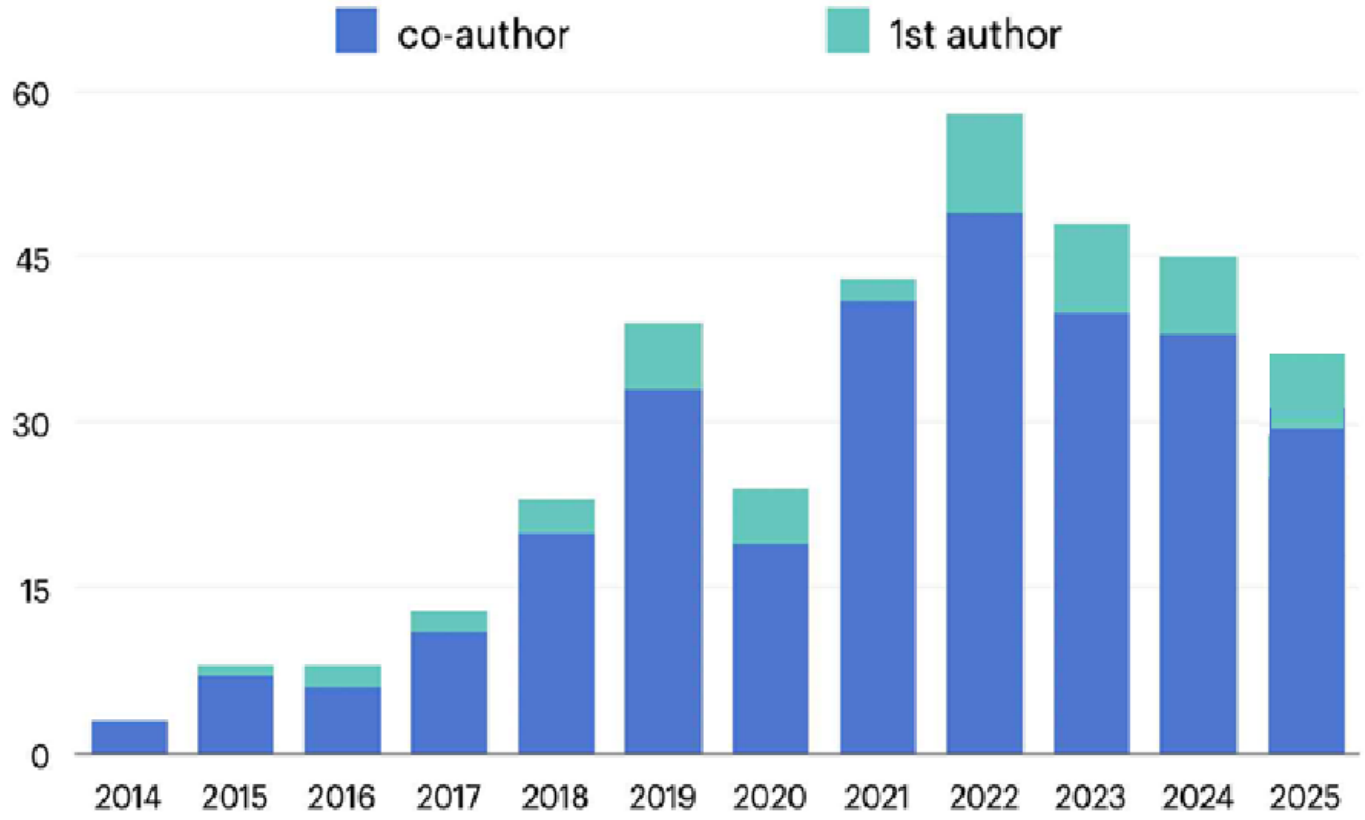
- Measuring Radiation Patterns of Receiver Optics
  - To estimate aperture efficiency
- Software Upgrade
  - Implementation of user requests
    - Single-axis scanning
    - Off-signal reference measurement
    - Timestamp on each measurement point
    - …
    - **Status:** 9 out of 15 requests completed
  - Plan: 10x Improvement in Measurement Speed
    - OTF (On-The-Fly) function is under development

ARC Activities

- Regular QA2/P2G/CS activities
- AoD (2026/6-7), Cone-search, DPGS, ngOT tester,
- User support activities:
  - ALMA Proposal preparation Workshop (2025/1/13-17)
  - Town hall meeting (2025/3/24)
  - ALMA proposal lecture support in SNU (2025/3/17,31)
  - 8th ALMA summer school (2025/07/28-08/01)

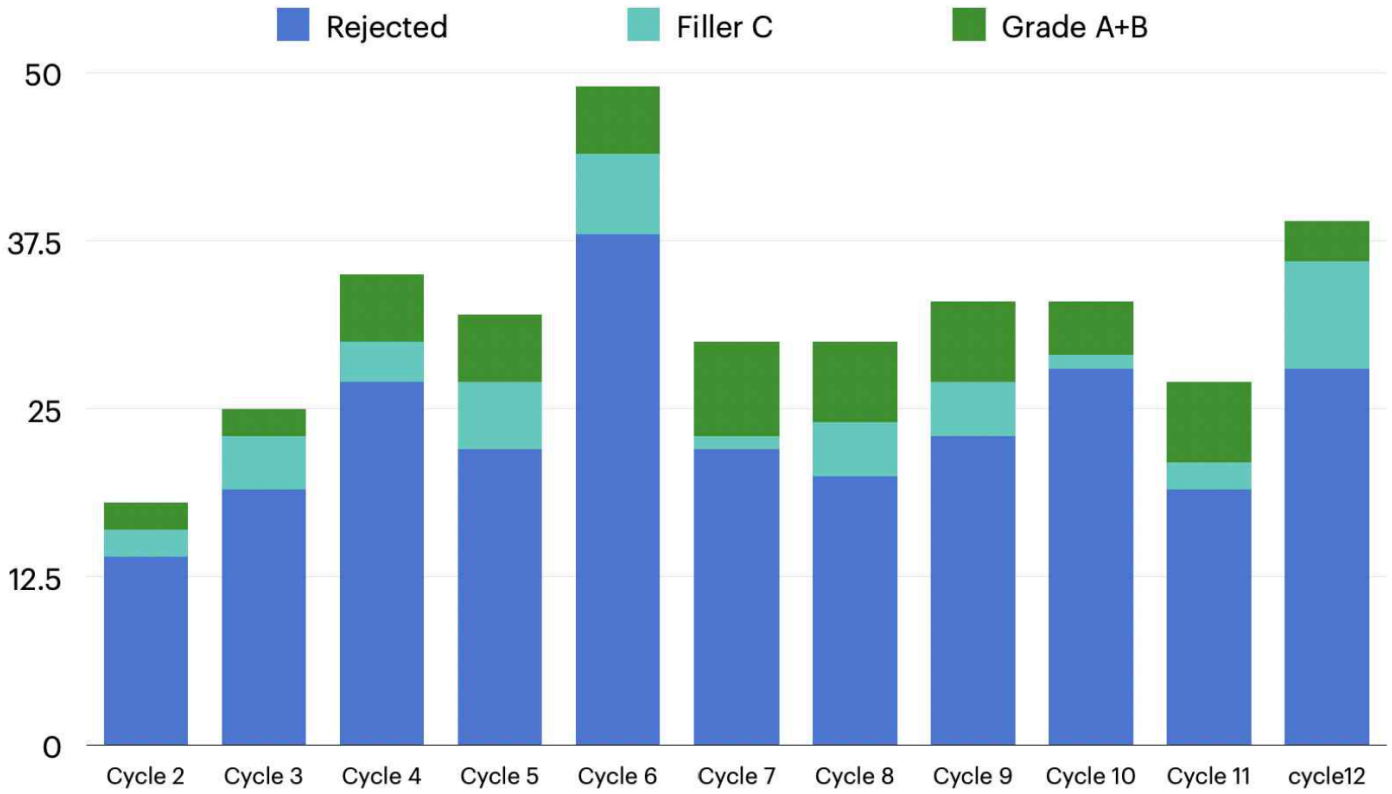
ALMA Publication statistics

- Published Papers using ALMA data: 36 (1st author paper: 7)



ALMA Proposal statistics

- 39 proposals submitted (2.4 % of total 1640)
- 11 proposals accepted (3B + 8C)



ALMA Proposal Preparation Workshop

(January 13-17, KASI)

Program

- **January 13 (Monday):**
  Start Time: 1:30 pm
  - Opening remarks (Dr. Jongsoo Kim, 5 min)
  - Overview of ALMA capabilities (Dr. Aran Lyo, 30 min)
  - Introduction to the review process (Dr. Min-Young Lee, 30 min)
  - Proposal writing guide (Dr. Seokho Lee, 1 hr)

  Break (30 min)
  - Individual introductions of target interests and ideas (1 slide per person, < 5 min)

- **January 14 (Tuesday):**
  Start Time: 9:30 am
  - Tips for proposal writing and insights into reviewers' tendencies (Dr. Yusuke Aso (PDF) and Prof. Jongho Park (PDF), 1 hrs)

  Break (30 min)
  - Technical Justification and target feasibility with examples (Dr. Seokho Lee and Dr. Hyeong-Sik Yun, 1.5 hrs)

  Lunch: 12:30 PM (1.5 h)
  - Group discussions and drafting of proposal outlines (untill 5:30 pm)

- **January 15 (Wednesday):**
  Start Time: 9:30 am
  - Proposal writing (continued)

  Lunch: 12:30 PM (1.5 h)
  - Proposal writing (untill 5:30 pm)

- **January 16 (Thursday):**
  Start Time: 9:30 am
  - Proposal writing (continued)
  - Finalise drafts and circulate (before noon)

  Lunch: 12:30 PM (1.5 h)
  - Proposal writing (untill 5:30 pm)

- **January 17 (Friday):**
  Start Time: 9:30 am **Summary Presentations and Feedback** (15 min/person):
  - 5 people (1.25 h)

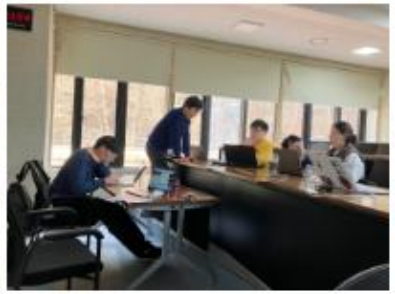
  Break (30 min)
  - 5 people (1.25 h)

  Lunch: 12:30 PM (1.5 h)
  - 6 people (1.5 h)

Lectures & Tips

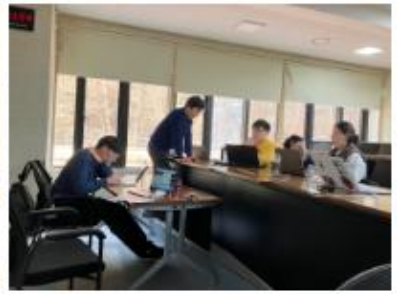
Group activities

Presentation & Feedback



ALMA Proposal Preparation Workshop

- 16 participants + 7 staff
- Four groups:
  - Re-submission/ Ready (two)/ Beginner
- 12 participants submitted proposals.
  - **15 proposals** (one with 4 proposals)
- **2 proposals were accepted** (1B + 1C)



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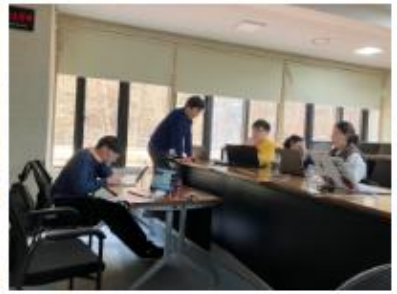
  - For beginner, estimating expected source intensity (feasibility check) was one of the most challenging part.
  - Some participants did not submit proposals because their original science goals required excessive observing time.



8th ALMA Summer School

- July 28 – August 01,
- Sobaeksan Observatory
- 14 students from five institutions + 7 staff
- Three groups:
  - Self-calibration
  - Multi-configuration
  - Spectral line analysis

8th ALMA Summer School

Program

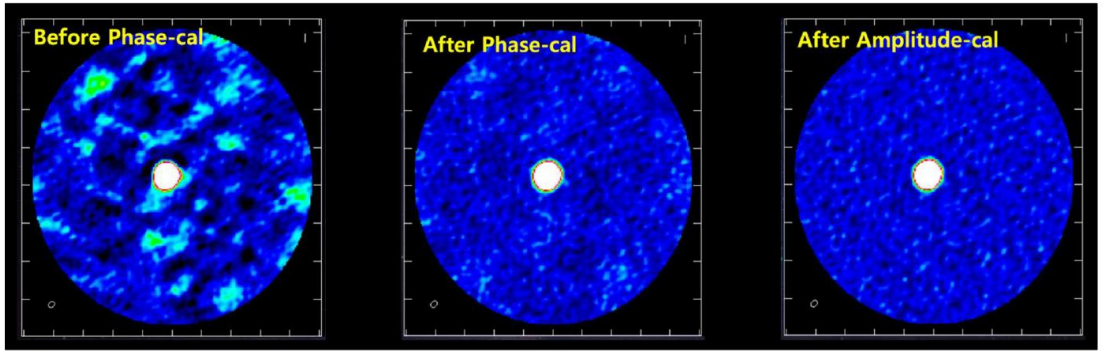
July 28 (1:30-2:30 pm): Travelling together from the Jukryeong service area to the observatory
July 28 (3:30-5:00 pm): Introduction of radio astronomy and ALMA (Jongsoo Kim)
July 28 (5:00-6:00 pm): Preparing computers
July 28 (6:00 pm): Welcome reception
July 29 (9:00 am-12:00 pm): ALMA imaging tutorial (Aran Lyo)
July 29 (1:00 pm): Group projects
July 30-31: Group projects, hiking, and stargazing
August 1 (10:00 am-12:00 pm): Group presentation
August 1 (12:00 pm): Lunch and going down the mountain

Group 1: Self-Calibration

Why do we need self-calibrations?

Phase errors:
- Emission is smeared and astrometry is degraded.
- Flux is reduced and weak emission undetected
- Anti-sysmmetric artefacts in image

Amplitude errors:
- Spotty or stripy emission
- Flux reduced and/or Noise increased
- Symmetric artefacts in image



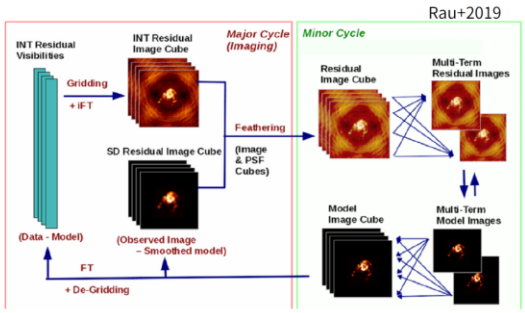
Group 2: Multi-Configuration

Combining TP &7m+12m

SDINT

1. (Major cycle) CLEAN int. data → psf (dirty beam) & dirty image generated
2. load SD image cube
3. feathering (INT dirty image, SD image) → combined image generated
4. (Minor cycle) CLEAN combined image → joint psf & joint dirty image generated
5. new residual SD image and new residual INT residual
6. degridding
7. feathering (new INT residual map, new SD residual map
8. (4–5) repeated

Rau+2019

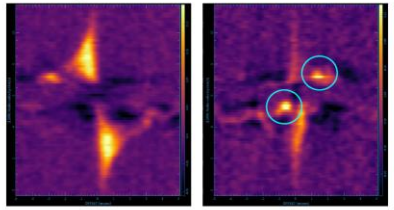


Group 3: Spectral Line Analysis

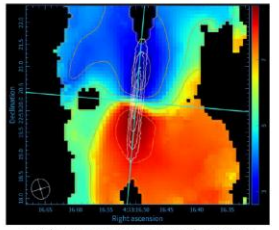
04302+2247 ^{13}CO - Moment 1 map: infall gas

IRAS 04302

major axis minor axis



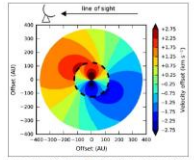
moment 1 map



continuum contour + mom1 contour

PV-diagrams show velocity gradients.
Major axis pv diagram shows spin-up rotation, which suggests the Keplerian rotation.
Two blobs in the minor one mean a velocity gradient along the E-W direction as seen in the mom1 map.
This suggests infall gas of the protostar.

Mom1 can be explained by the combination of an inner Keplerian disk and an outer infalling rotating envelope.
Rotation+infall makes a velocity gradient in a diagonal direction.



(van 't Hoff et al. 2018, A&A, 615, A83)

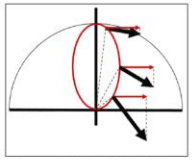


diagram which explains rotation

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A **mentor-and-tutor** system was introduced this year, which provided more intensive guidance than the previous single-mentor system.

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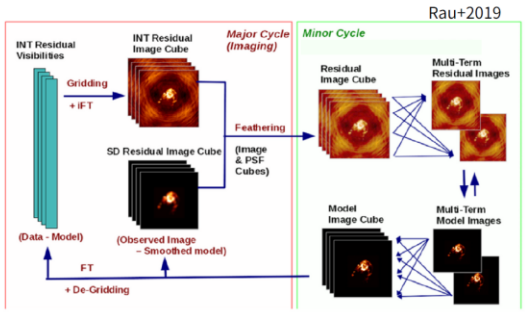

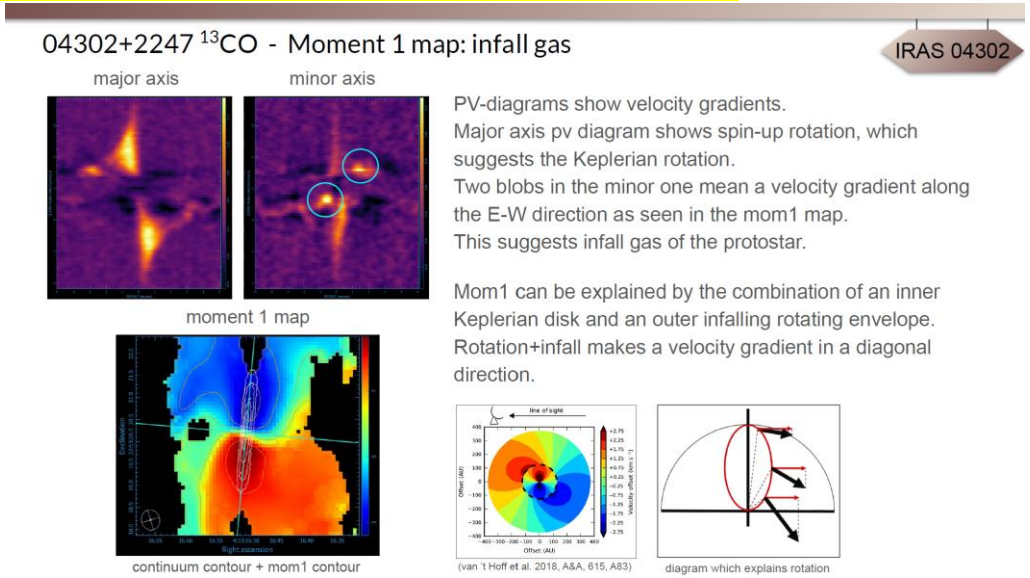

https://alma.kasi.re.kr

Thank you for your attention!!

ALMA

Atacama Large Millimeter/submillimeter Array

- ☆ News
- ○ Korean ARC Node
  - Staffs
  - Science Meetings
  - Useful Links for Staff
- ○ Instrumentation
- ○ Summer Schools
- ○ Publication

Announcements

2025-July-14

The 8th ALMA Summer School

The 8th ALMA Summer School will be held at Seobaeksan Observatory from July 28 to August 1 with the following program: