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Operating the Largest Sub-mm Single Dish Facility in the World

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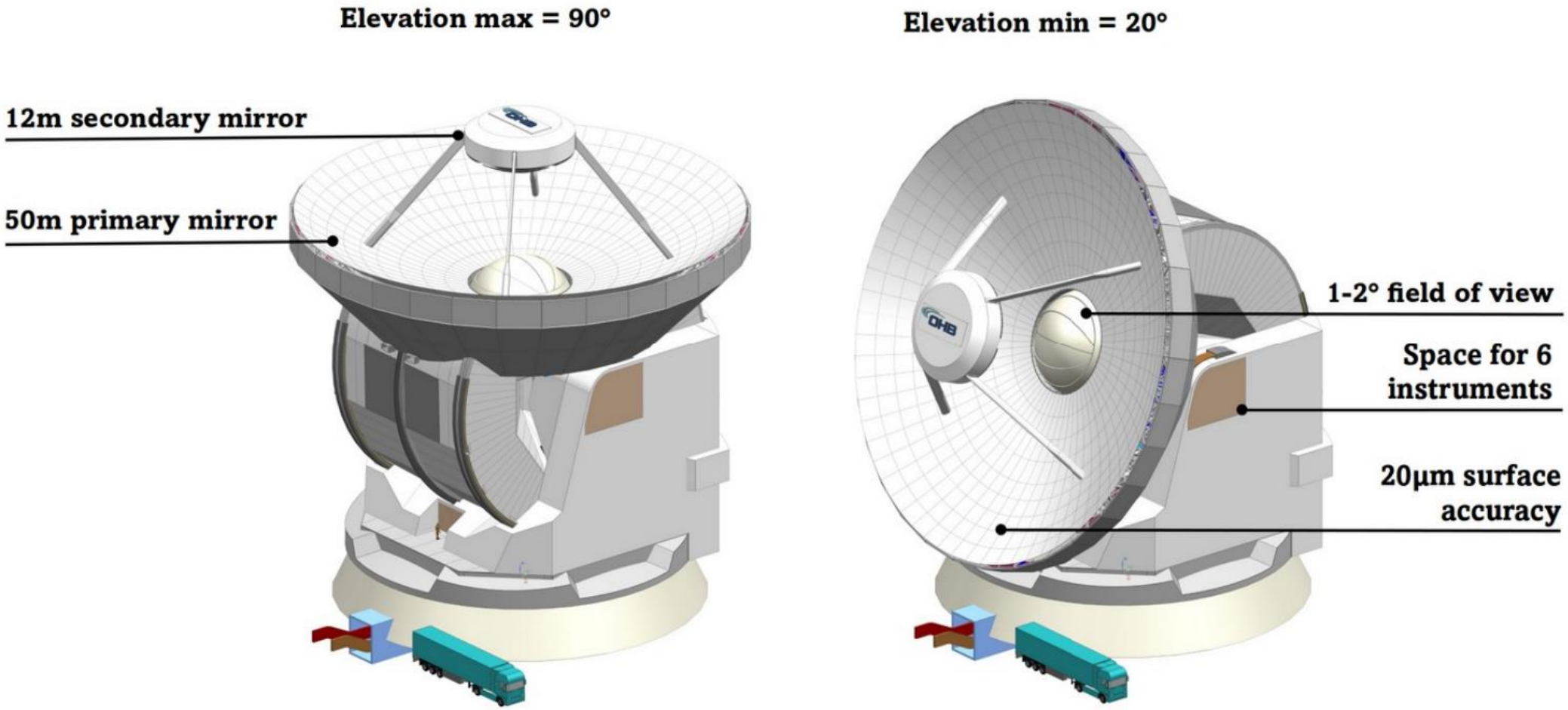
What is AtLAST?

- Atacama – on the Chajnantor Plateau, alongside ALMA and APEX
- Large – 50m diameter dish
- Aperture – 1-2° field of view
- Submillimeter – 0.3-9mm / 35-950GHz
- Telescope

AtLAST Design

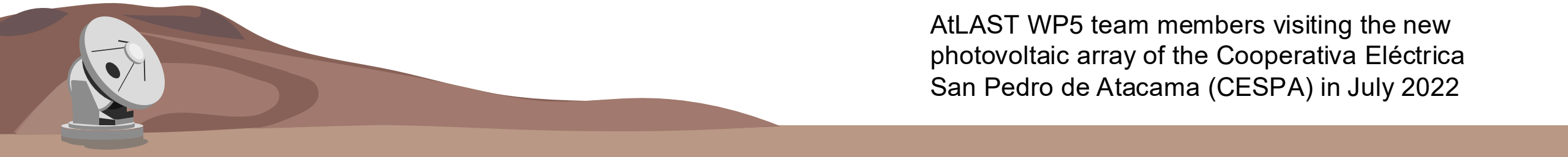
See Mroczkowski et al. 2025, Reichert et al. 2024,
Puddu et al. 2024, Gallardo et al. 2024



Environmental Sustainability

- Design includes sustainability from the start.
- Dish will use novel regenerative braking technique to reduce power consumption (Kiselev et al. 2024).
- In-depth study into sustainable power supply has also been conducted demonstrating how the telescope can be powered with renewable energy (Viole et al. 2023, 2024a, 2024b).
- There is potential for this to be in collaboration with the local communities for mutual benefit (Valenzuela-Venegas et al. 2024).

AtLAST WP5 team members visiting the new photovoltaic array of the Cooperativa Eléctrica San Pedro de Atacama (CESPA) in July 2022



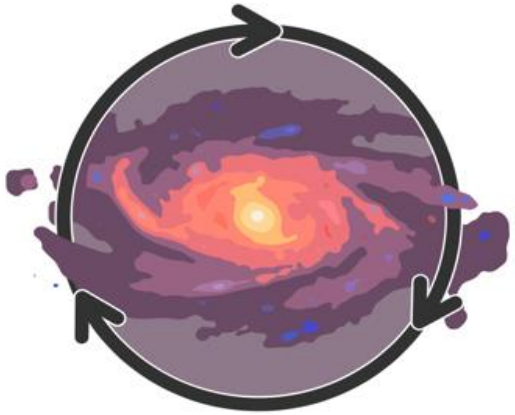
Key Science Drivers

Science Overview Report: Booth et al. 2024b

Images – Luca Di Mascolo

Where are all the baryons?

- Measuring the **total gas and dust content** of the Milky Way and other galaxies, in the interstellar, circumgalactic, and intergalactic media through deep, wide-field (>500 deg^2) blind surveys
- Reaching down to the sensitivities required to probe the **typical populations of sources**
- x10,000 lower confusion noise at 350µm than CCAT



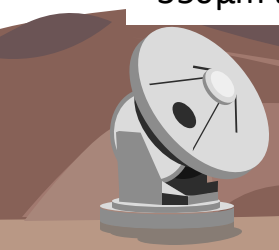
How do structures interact with their environments?

- **Lifecycle** of gas and dust
- **Baryon cycle on multiple-scales**
- **Interplay** between gravity, radiation, turbulence, magnetic fields, and chemistry and their mutual feedback

High spectral res line observations; polarization measurements; all with **high sensitivity to large (up to deg scales) low surface brightness structures**

What does the time-varying (sub-)mm sky look like?

- **High cadenced and rapid response** observations from the Solar chromosphere and other objects in our Solar System to luminosity bursts in everything from protostars to active galactic nuclei
- **Built-in transient detection** algorithms
- **High time resolution (~sec) solar obs**

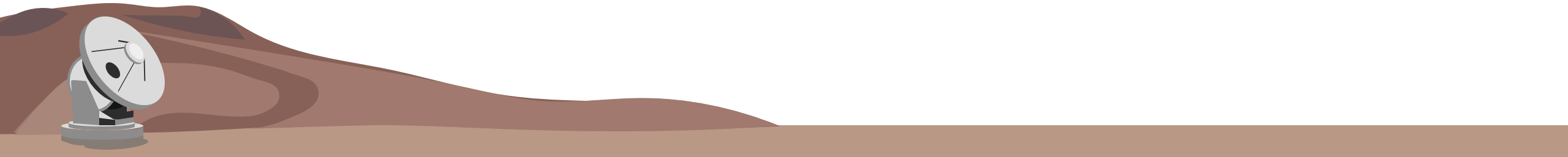


Telescope requirements

λ_{obs} = 350 µm - 10 mm (30-950 GHz)
D= 50m (<5" res across sub-mm)
Large FoV (1 - 2 deg)
Fast scanning (3 deg/s)
Solar capabilities

AtLAST: a facility of the future

- Operations from the 2030s to the 2080s
- Guiding principles: Lean, high-performance model; Safety; Sustainability; Transparency; Community involvement; Diversity, equity and inclusion
- Currently investigating:
  - Remote distributed operations
  - Data infrastructure
  - Tailored user support model



Remote distributed operations

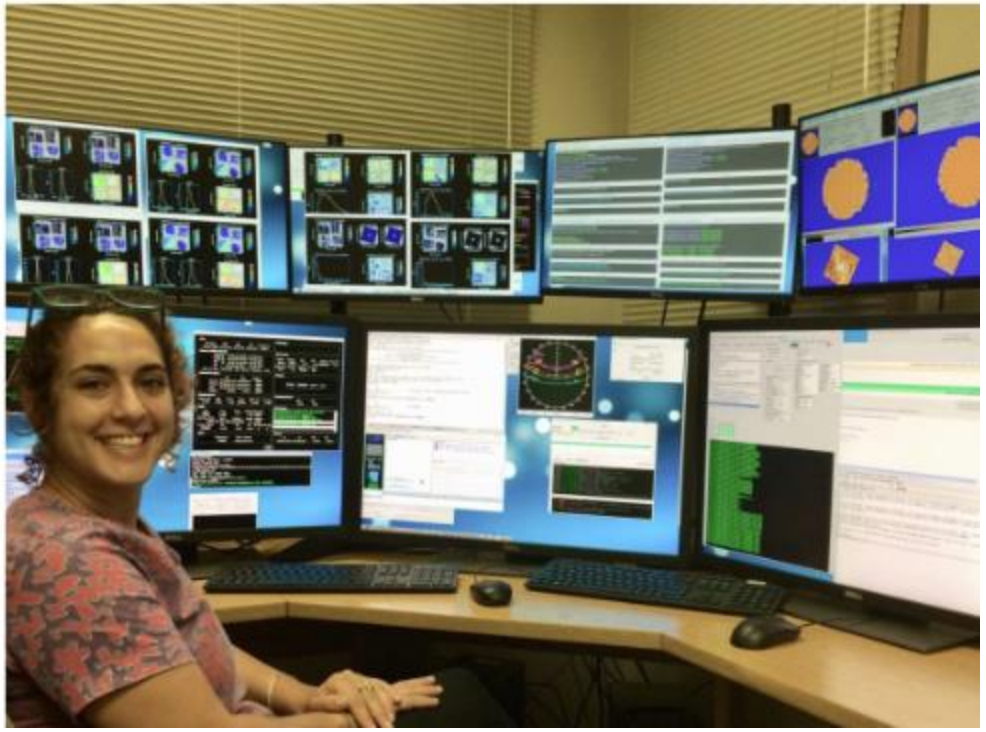
- Remote operations are becoming increasingly common and have a range of benefits for telescope operators and astronomers including improved working conditions, better work-life balance, reduced CO_2 footprint and inclusivity.
- With AtLAST, we also plan to have multiple remote operations sites distributed around the world covering 24/7 operations mostly within working hours.

JCMT shifts to Remote Operations

November 2, 2019 News

JCMT has began a new era. Starting November 1st all data obtained at the JCMT will be observed remotely from Hilo. The first night of Remote Observing was staffed by JCMT Telescope Operator Mimi Fuchs.

JCMT astronomers who obtain data on a given night will now receive an automated email to inform them of observation being taken. At that time users are welcome to "eavesdrop" on operations by joining a remote connection directly to the JCMT Remote Observing Control room (JROC) in Hilo via the link provided in the automated email.



Data infrastructure

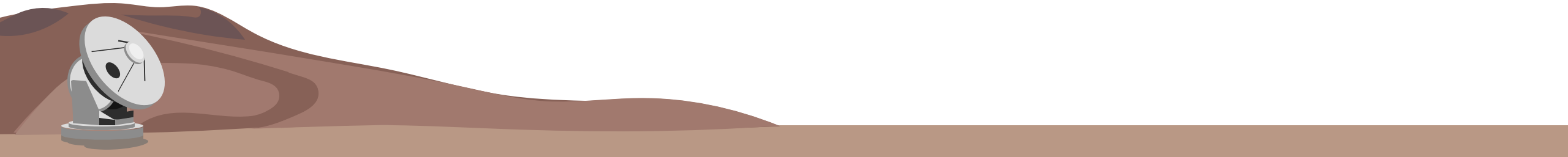
- AtLAST instruments will produce vast amounts of data, e.g. aiming to have a 10^6 pixel continuum camera to fill the field of view with output being recorded at rapid sampling rates for studies of short-term variability and detection of transients.
- Concept development for the AtLAST Interface for Remote Exploration (AIRE) that covers proposing, scheduling, archiving and much more.

User support model

Develop the AtLAST user support model that will aspire to maximize the scientific output of the facility, by:

- **A**dapting user support practices to the evolving needs of the AtLAST user community
- **S**trengthening the user base
- **P**romoting continuous improvements of tools, workflows, and documentation
- **I**nvesting in the transparency of the project
- **R**e-evaluating regularly the user and observatory policies
- **E**nsuring that AtLAST remains at the forefront of user support throughout its lifetime

We're building on experience (e.g. with ALMA), but are also open to change based on community feedback.



Thanks!

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