

THE LARGE MILLIMETER TELESCOPE COMMUNITY MEETING #1

David Hughes

LMT Director

INAOE, Mexico

Pete Schloerb

LMT P.I. - USA

UMASS, USA



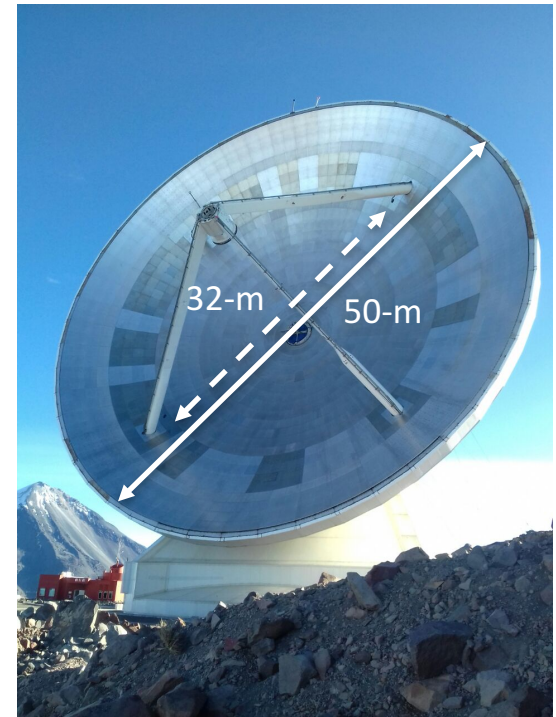
Volcan Sierra Negra, alt. 4600 m

LMT Community Meetings

- #1 Overview
 - Current status of LMT (Hughes)
 - Opportunity for open-time observing proposals (Hughes)
 - LMT operations planning (Schloerb)
 - User-community Q&A session
- #2 U.S. Community Access to the LMT
- #3 Call for Open-Time Observing Proposals & Instrumentation
- #4 Future Development: optimization of telescope performance, operational efficiency & scientific productivity

Large Millimeter Telescope (LMT)

- bi-national project (> 1994)
 - Mexico (INAOE/CONACYT), USA (UMASS/NSF)
- **50-m primary reflector** (180 segments)
 - 1440 composite panels (Media Lario)
 - 720 actuators
- active primary surface r.m.s. (~ 75 microns goal) to **compensate deformations (gravity & thermal)**
- operational wavelengths: 1.1 - 4 mm
- beam resolution (FWHM): 5 - 18 arcsecs
- Field of View: 4 arcmins diameter
- LMT 32-m shared-risk Early Science (2014-2017)
 - 13 months observing (integrated)
 - 33 publications (+) / 12 PhDs, 3 MSc
- **LMT 50-m commissioning/alignment > mid-2018**
 - commission SEQUOIA, RSR, VLBI Rx1.3mm on LMT 50-m
 - delays to starting 2018-S1



LMT Observatory (LMTO)

September 2018 – **Letter of Intent** signed (CONACYT, INAOE & UMASS) **to create a new entity, the LMT Observatory**

- to maintain, operate and develop the telescope infrastructure
- to provide (service) observing support to the user-community at a high-level expected of an international telescope facility
- Financial support (> October 2018) from CONACYT / FORDECYT
- \$150 M pesos (\$6.8 M USD) – 27 months remaining + no-cost extensions

& complemented by NSF MSRI (2019) & MSIP (2020) funds awarded to UMASS/U. of Maryland

CURRENT STATUS

- Security concerns continue (> 04/18) in local area close to LMT.

Serious incidents in late 2018/early 2019. Immediate suspension of activities. Coordinated travel with Puebla State police from spring 2019 (50% night-time access to LMT).

- requires development of new protocols, strategies & infrastructure minimize risk to LMT staff and visiting researchers

- remote operation & observing support (TO/SS at INAOE/UMASS)
- oxygenated working & sleeping areas within LMT (reduce effective altitude to 2500 – 3000 m)

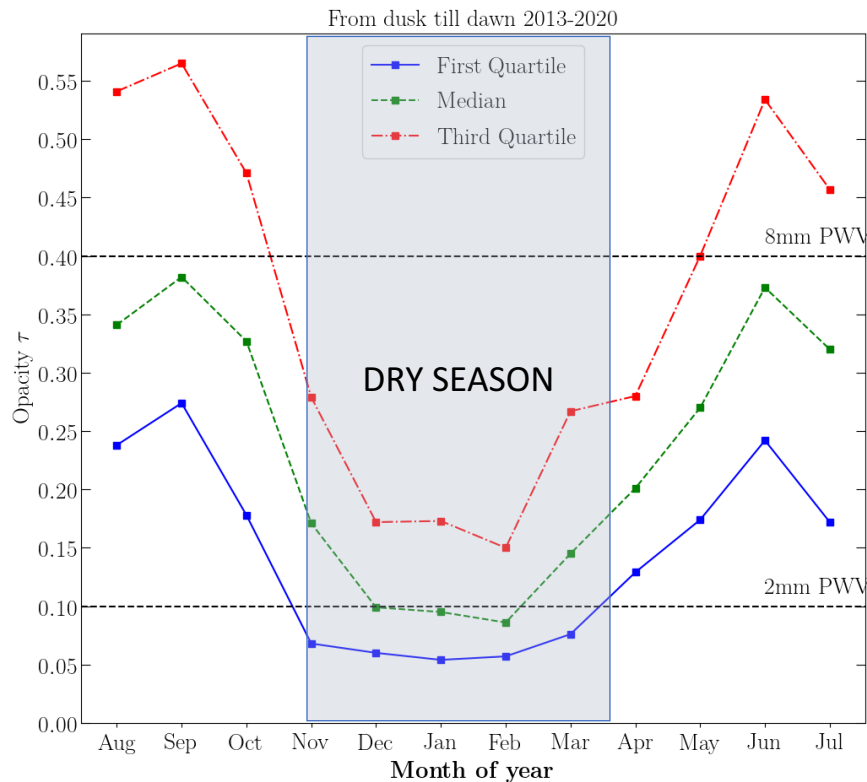
- COVID-19

LMT closed since late March 2020. Hope to reopen by end 2020.

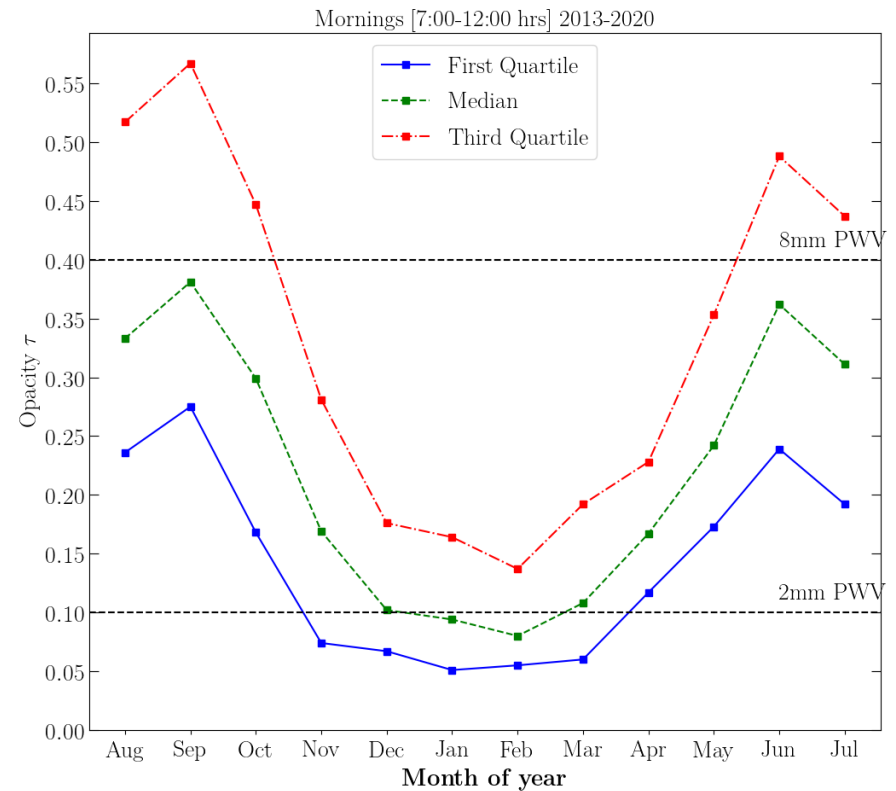
- Maintenance & recommission telescope infrastructure
- optimize surface alignment (photogrammetry < Jan or > March)
- install next-generation instruments (TolTEC, MUSCAT)

Sierra Negra 225 GHz atmospheric opacity

- opportunities for day-time observations

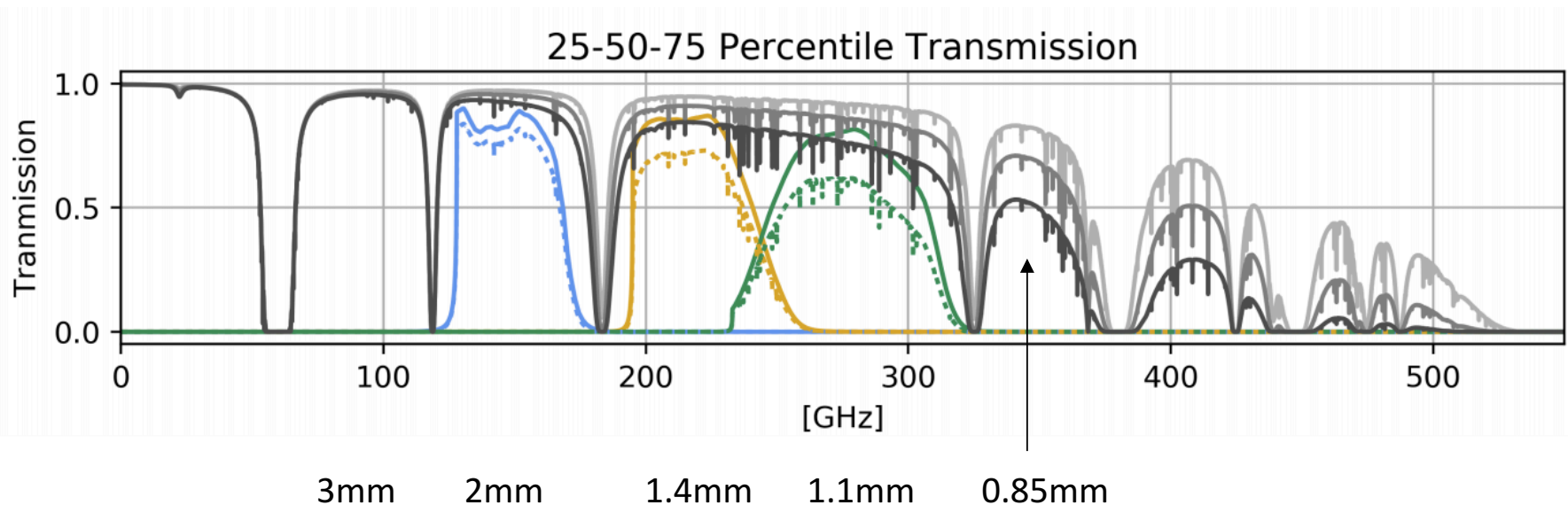


Dusk to dawn (10 hrs)



Mornings 07:00 – 12:00

LMT submillimeter window in the winter months



CONACYT + NSF fund the optimization of telescope performance and scientific productivity

Control of thermally-induced deformations to enable extended daytime operations & sub-mm (850 μ m) observations

Antenna BUS ventilation system (circulate air)

Improved measurement of thermal gradients within telescope structure

Atmospheric model for Volcán Sierra Negra

Bryan et al. 2018. <https://arxiv.org/pdf/1807.00097.pdf>

LMT instrumentation development

3mm	2mm	1.4mm	1.1mm	0.85mm
Spectral-line Receivers				
RSR 2px 74-111GHz				
VLBI (RSR)	B4R 1px 125-163GHz	VLBI (EHT) 222GHz	Superspec MKIDS on-chip 190-310 GHz	VLBI (EHT)
SEQUOIA 16px, 85-100, 100-115GHz			OMAYA 8px 2SBS 210-280 GHz	
Continuum Imaging Cameras				
			AzTEC 144px	
			MUSCAT LEKIDS 1500px	
	TOLTEC LEKIDS PSB 900px	TOLTEC LEKIDS PSB 1800px	TOLTEC LEKIDS PSB 3600px	

LMT Call for Proposals

Mexico (65%), UMASS (15%), U.S. Community (15%), Spain (5%)

Schedule	2021 – S1 (6 months)	2021 – S2 (12 months)
Observing season	March 15 th - September 14 th 2021	September 15 th 2021 – September 14 th 2022
Open call	Oct 31 st 2020	April 15 th 2021
Close call	December 15 th 2020	May 31 st 2021
Conclude review & announcement of results	March 1 st 2021	August 15 th 2021
Instruments	SEQUOIA, RSR, B4R, Rx 1.3mm	SEQUOIA, RSR, B4R, Rx 1.3mm, TolTEC

Shared-risk: dates subject to change