COATLI and DDOTI, the new telescopes to catch transients

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Advisors:

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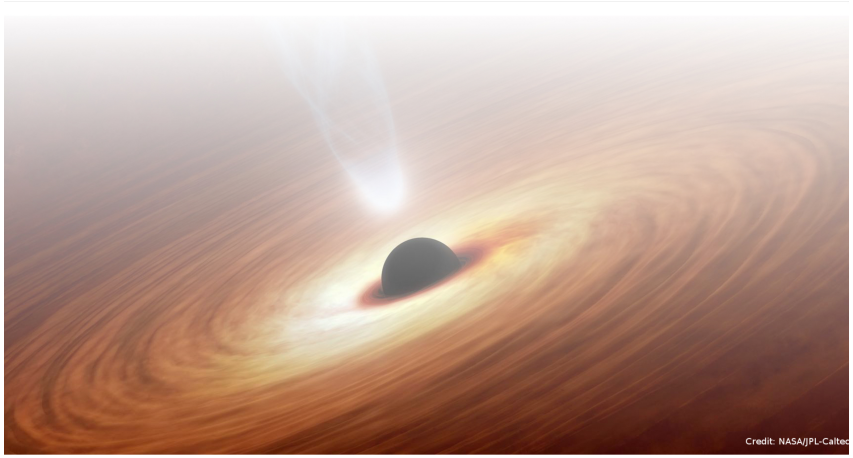
Dr. William Lee Alardín

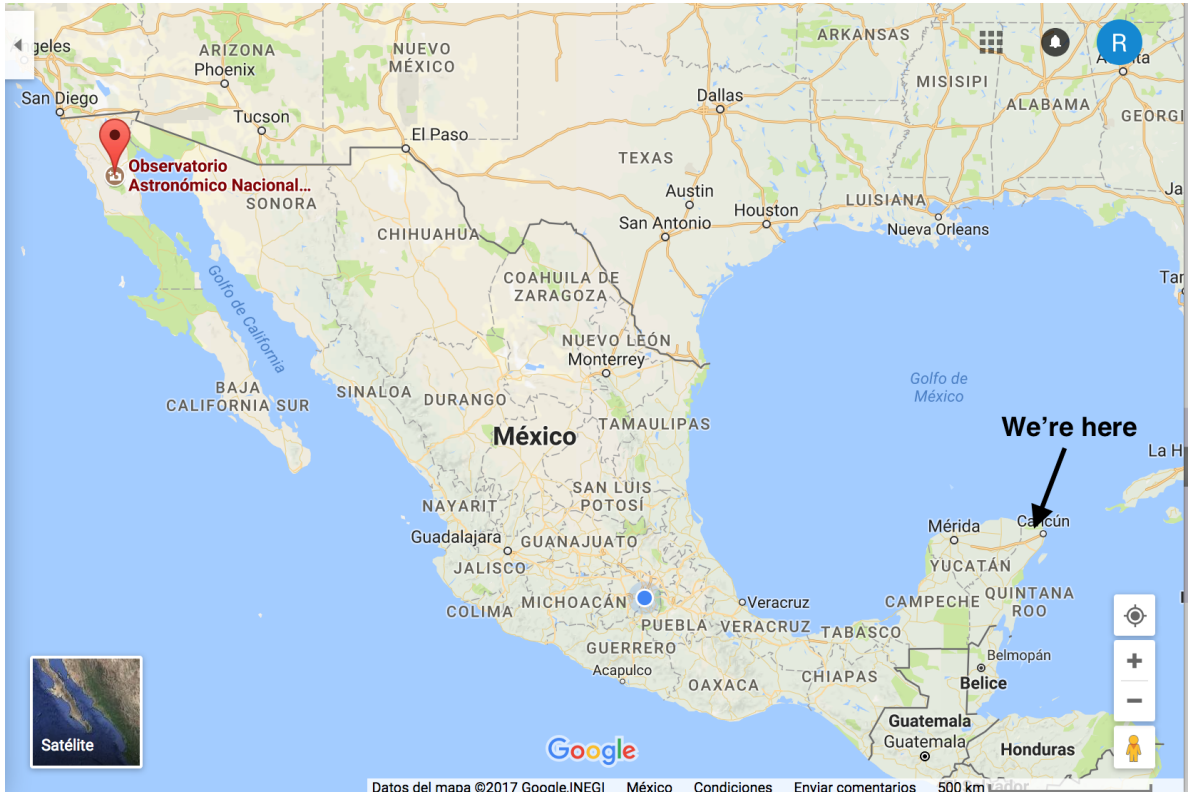


Instituto de Astronomía,UNAM, México
Deciphering the Violent Universe
December 2017, Playa del Carmen, México.

#DVU2017

Observatory

Observatorio Astronómico Nacional, San Pedro Mártir, Ensenada. (2700m amsl)



COATLI

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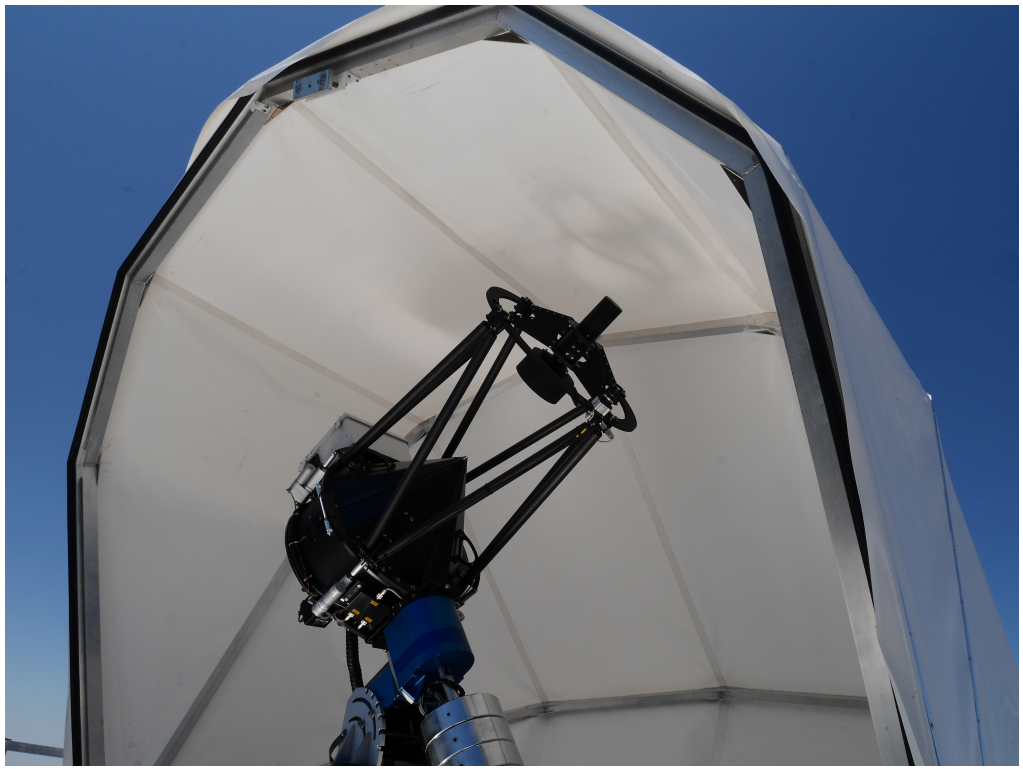
Corrector de Óptica Áctiva y de Tilts al Límite de dIfracción or *active optics and tilts corrector at the diffraction limit*

GOAL: High resolution images



COATLI collaboration

Alan M. Watson, Salvador Cuevas Cardona, Luis C. Alvarez Núñez, Fernando Ángeles, Rosa L. Becerra-Godínez, Oscar Chapa, Alejandro S. Farah, Jorge Fuentes-Fernández, Liliana Figueroa, Rosalía Langarica Lebre, Fernando Quirós, Carlos G. Román-Zúñiga, Jaime Ruíz-Díaz-Soto, Carlos G. Tejada, and Silvio J. Tinoco.

México.

Features of COATLI

- ★ Robotic
- ★ ϕ=50cm.
- ★ 2 channels (COATLI means *twins* in Nahuatl).
- ★ *gri*-bands.
- ★ FWHM=0.3" image quality.
- ★ Limited by diffraction.
- ★ Fast mount.

How to achieve the high quality?

- ★ An open enclosure.
- ★ An elevated enclosure in a good site for seeing.
- ★ A red channel operating from 550-920 nm with a CCD.
- ★ A blue channel EMCCD for tilt correction.
- ★ A fast tilt mirror correcting both channels.
- ★ A deformable mirror for active optics.
- ★ Guide star (isokinetic angle).
- ★ A robotic control system.

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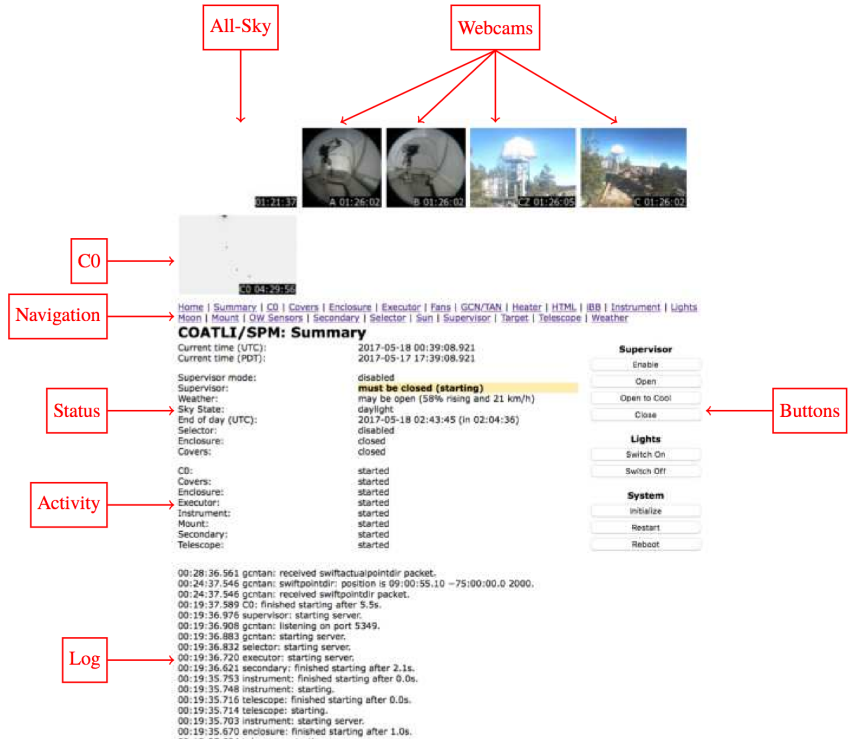


Science of COATLI

- ★ Prompt emission of GRBs (my PhD thesis)
- ★ Location of gamma-ray bursts in their host galaxies.
- ★ Eclipsing binaries in the Trapezium.
- ★ HII regions in nearby galaxies.
- ★ Galactic star clusters.
- ★ Sub-stellar companions in the Solar neighborhood
- ★ Multiplicity in young clusters
- ★ Planetary nebulae in the bulge

Status of COATLI

- ★ We have an interim system.
- ★ The pipeline of data reduction is finished.
- ★ Three GCN of GRBs emissions at this moment.
- ★ m=18 with 5s and m=21-22 (in hours)
- ★ We are ready to response to the BAT alerts :D

DDOTI

GOAL: Counterpart of GWs

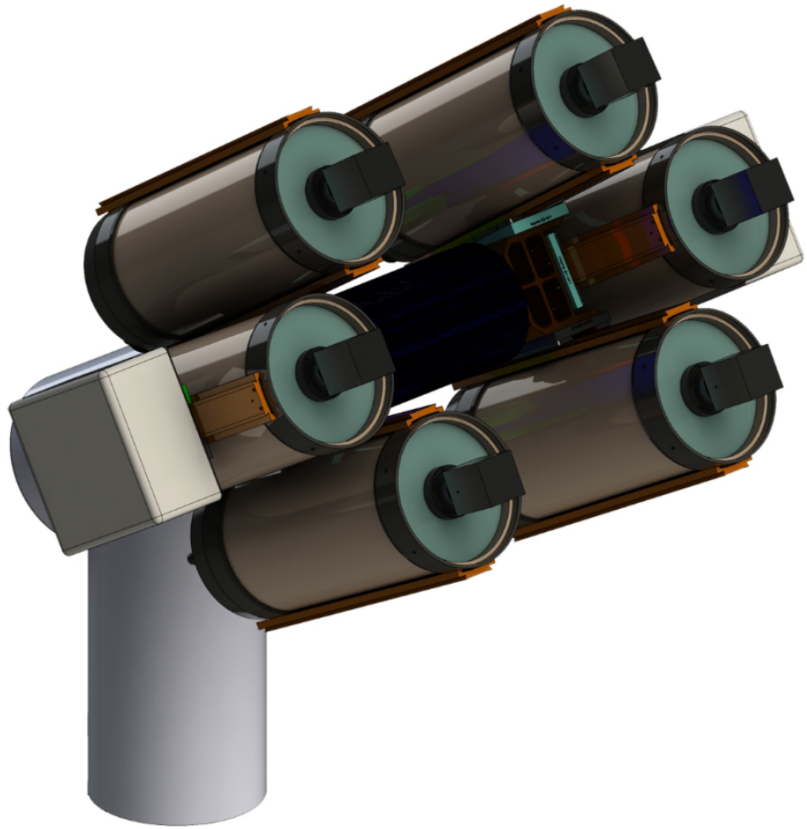
DDOTI collaboration

Alan M. Watson, William H. Lee, Eleonora Troja, Carlos G. Román-Zúñiga, Nathaniel R. Butler, Alexander S. Kutyrev, Neil A. Gehrels, Fernando Ángeles, Stéphane Basa, Pierre-Eric Blanc, Michel Boër, Jose A. de Diego, Alejandro S. Farah, Liliana Figueroa, Yilen Gómez Maqueo Chew, Alain Klotz, Fernando Quirós, Maurico Reyes-Ruíz, Jaime Ruíz-Díaz-Soto, Pierre Thierry, Silvio Tinoco

México, USA, France.

DDOTI

- ★ Deca-Degree Optical Transient Imager
- ★ Connected with Fermi (100 deg^2,250, GBRs/year 45 SGBRs/y)
- ★ Connected with Ligo (100 deg^2)
- ★ DDOTI will attempt to follow-up the Fermi/GBM GRB.
- ★ Field of 12 deg^2 for each telescope
- ★ The combined field will be of 72 deg^2



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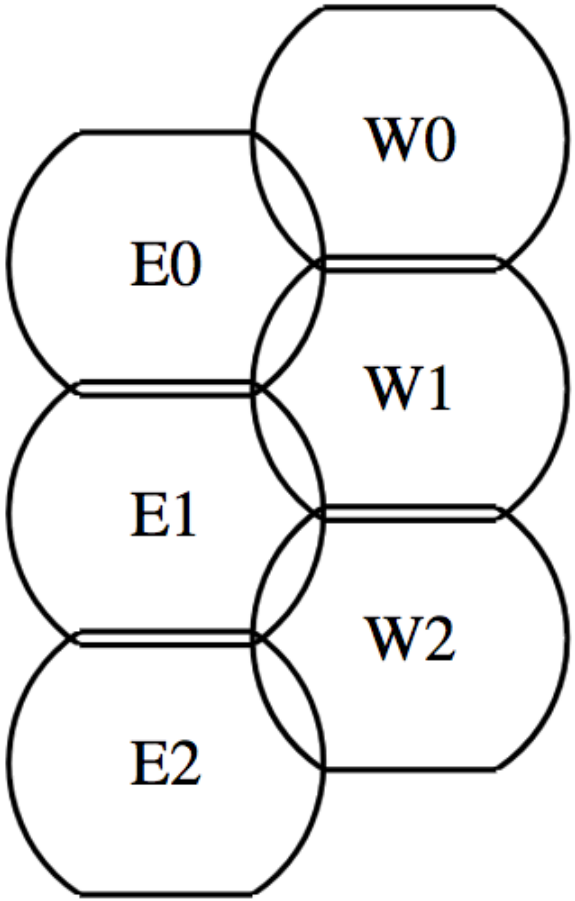
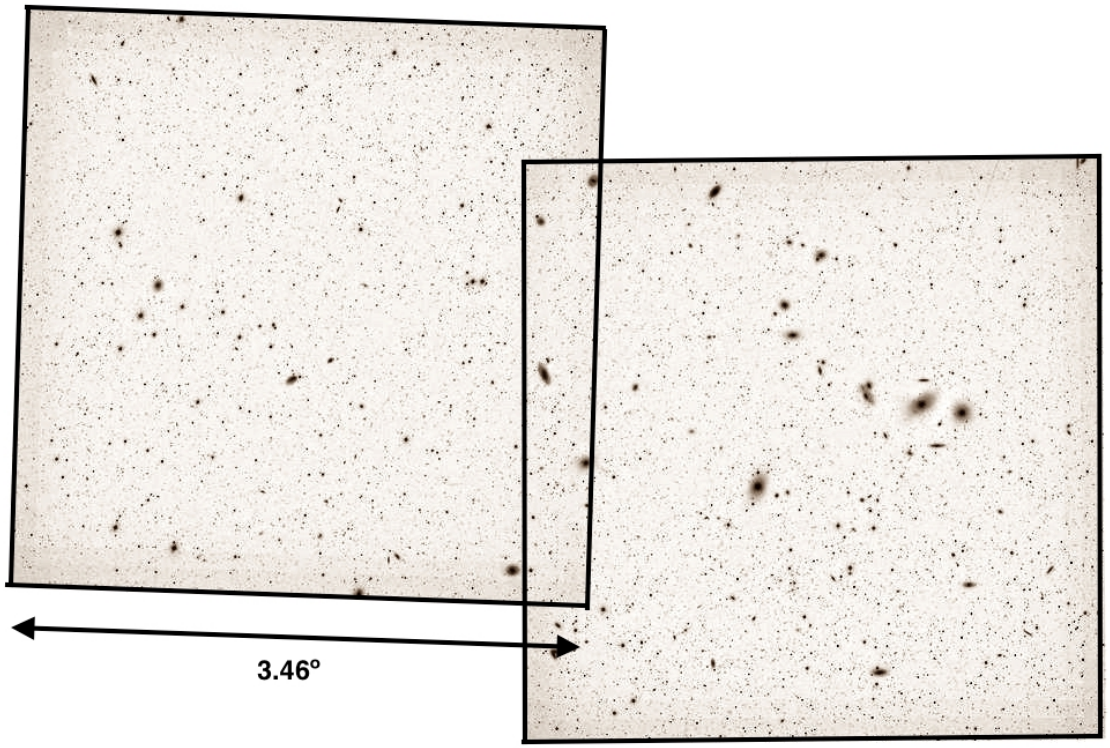


DDOTI

- ★ With only two telescopes...
- ★ We can reduct the error box of Fermi/LIGO.
- ★ More field at the same time.



Status of DDOTI

- ★ It ended the test phase.
- ★ Observing now.
- ★ Better fortune
- ★ We are expecting for a lot of GWs now...

Summary, COATLI and DDOTI

- ★ Robotic.
- ★ Cheaper that other telescopes ($500k).
- ★ Very fast installation.
- ★ Designed for transients (GRBs, GWs).

More information:

COATLI: an all-sky robotic optical imager with 0.3 arcsec image quality: https://arxiv.org/pdf/1606.00690.pdf
DDOTI: the deca-degree optical transient imager
https://arxiv.org/pdf/1606.00695.pdf

Thanks :)