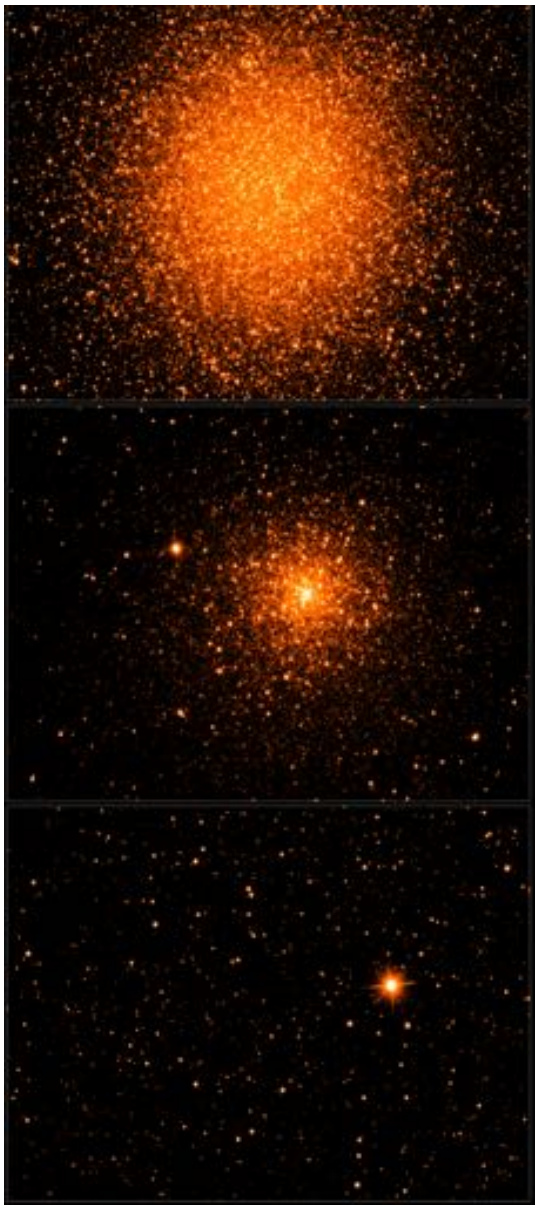
UTRGV The University of Texas Rio Grande Valley

Center for Gravitational Wave Astronomy

First light for the UTRGV TOROS telescope, highest-elevation American optical observatory

Brownsville, April 15, 2021. The UTRGV TOROS telescope reached a critical milestone last week obtaining "first light", as astronomers refer to the first image of the sky obtained by an instrument.

TOROS is funded by the National Science Foundation under a grant to UTRGV (PI Mario Diaz) as part of the "Windows on the Universe: the Era of Multi-messenger Astrophysics" program.



The installation, commissioning and operation of TOROS, as well as the analysis of its observations, are conducted jointly by UTRGV, Texas A&M University, and the University of Cordoba (Argentina). The main scientific goal of the project is to follow-up electromagnetic emissions associated with gravitational wave events (such as the merger of two neutron stars or a neutron star and a black hole).

The construction of the observatory's dome and the installation of the telescope were completed about a year ago, right as the COVID-19 pandemic prevented further work at the site. Activities were safely resumed last week, yielding these "first light" images. The observatory's design sensitivity is expected to be reached by the end of 2021 with the installation of specialized optics and a high-end digital CCD camera, which are currently undergoing development and integration at Texas A&M's Munnerlyn Astronomical Instrumentation Laboratory.

Located on Cordón Macón (a mountain range in the province of Salta, Argentina) at an elevation of 4,560 meters (15,000 feet), TOROS is the highest optical telescope operated by an American institution anywhere in the world (followed by the Meyer Womble Observatory in Mt Evans, CO at 4,312m and the Maunakea Observatory in Hawaii at 4,190m).

The images obtained as part of "first light" include: (top) Omega Centauri, a globular cluster about 17,000 light years away; (middle) NGC 6752, a globular cluster about 14,000 light years from Earth; (bottom) a region within the disk of the Milky Way close to the open cluster NGC 3766, with most stars being about 8,000 light years away.

Despite the sub-par conditions on the night these images were taken, their resolution and sensitivity were equivalent to seeing two Christmas tree lights placed 6 feet apart somewhere in College Station all the way from Brownsville.

Left: Placing the telescope inside its dome at Cordón Macón. Right: Ready for observations.

The TOROS dome in the foreground (with the ABRAS dome in the background) at the Cordón Macón astronomical site — 4,560 meters above sea level.