

UF and Gran Telescopio Canarias Unveil New Eye on the Infrared Sky

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The world's largest telescope - the Gran Telescopio Canarias (GTC) 10.4-meter telescope on the island of La Palma, Spain - announced the unveiling of a new window into the mysteries of deep space, with the release of the Canarias InfraRed Camera Experiment (CIRCE) for the use of astronomers worldwide.

CIRCE - a highly-sensitive camera for the near-infrared (1.0 to 2.5 micron) wavelength range - was developed at the University of Florida (UF) Department of Astronomy by a team led by Professor Stephen Eikenberry and consisting largely of UF students and postdoctoral scholars. This approach provided a path for graduate students and young PhDs to be trained as instrument builders, which is not generally possible in the context of modern major facility instrumentation projects for large telescopes, where the much larger instruments, budgets, and teams generally prevent untrained personnel from "learning the ropes" of instrument-building in a broad sense. The students involved included:

- Current students: Brian Chinn (undergraduate, class of 2016, Astronomy & Mechanical Engineering); Alan Garner (grad student, Astronomy); Deno Stelter (grad student, Astronomy); Kendall Ackley (grad student, Physics); Yigit Dallilar (grad student, Astronomy)
- Former students: Miguel Charcos-Llorens (PhD 2009); Michelle Edwards (PhD 2008); Nestor Lasso-Cabrera (PhD 2012)
- Former Postdoctoral scholars: Antonio Marin-Franch; Javier Cenarro

These young scientists were supported in the development of CIRCE by members of the UF infrared instrumentation group (including J. Greg Bennett; Charlie Murphey; Scott Mullin; S. Nick Raines; Craig Warner; Paola Miller; Frank Varosi; Veronica Donoso; Claudia Vega; and others).

The one-ton cryogenically cooled camera was installed on the GTC, atop a volcanic summit off the coast of Africa, by the combined staff of UF and GTC in late 2014, and underwent "commissioning" tests ending in summer 2015.

CIRCE provides the GTC with its first camera capable of viewing the near-infrared portion of the spectrum, allowing the monster telescope to detect extremely distant galaxies and to penetrate the dust that shrouds the black hole at the center of our own Milky Way galaxy, among many other scientific applications. CIRCE has particularly good image quality and its sensitivity in some regions of the spectrum surpasses even that of the renowned Hubble Space Telescope.

Already during its commissioning CIRCE has made several important discoveries - including the death of a massive star far across the Universe in a flash of super-energetic gamma-rays (Figure 1), and the infrared outburst of the long-dormant black hole system V404 Cygni (Figure 2).

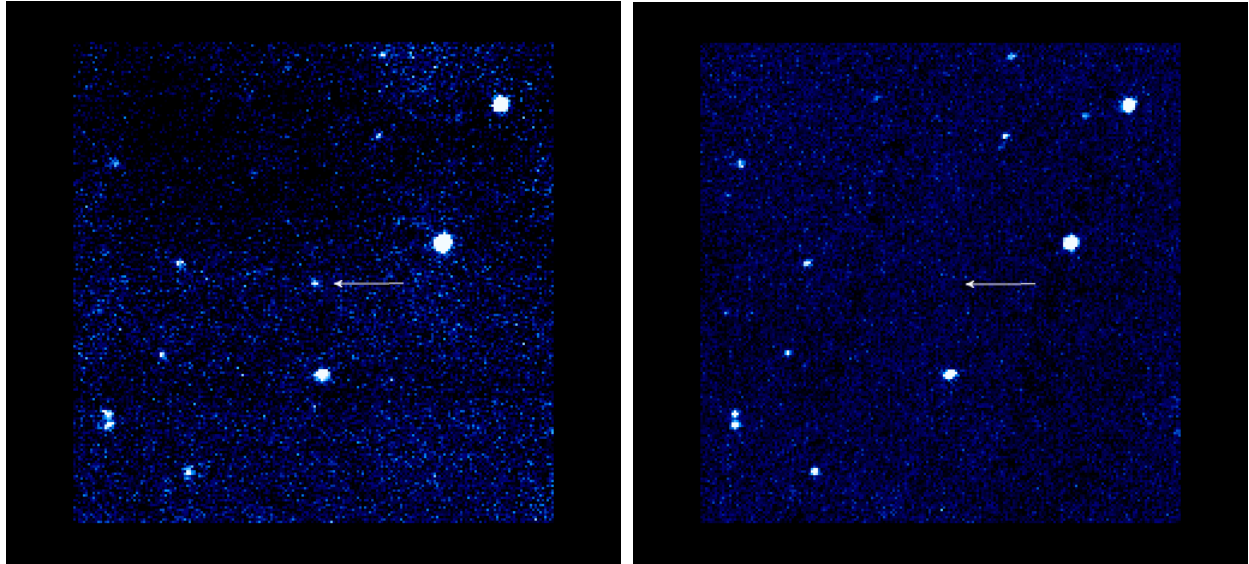


Figure 1 - CIRCE observed the location of a flash of gamma-rays first discovered by NASA's SWIFT satellite. The gamma-rays are thought to indicate the death knell of a massive star in a very distant galaxy, via the most extreme explosions seen since the Big Bang. CIRCE observed this region of sky on the same day the gamma-ray flash occurred, finding a very faint infrared glow (left) which had then faded away to obscurity a few weeks later (right). Astronomers in Spain and the US are now using the CIRCE data to help further understand the nature of these powerful explosions. [Images courtesy of Kendall Ackley and Stephen Eikenberry).

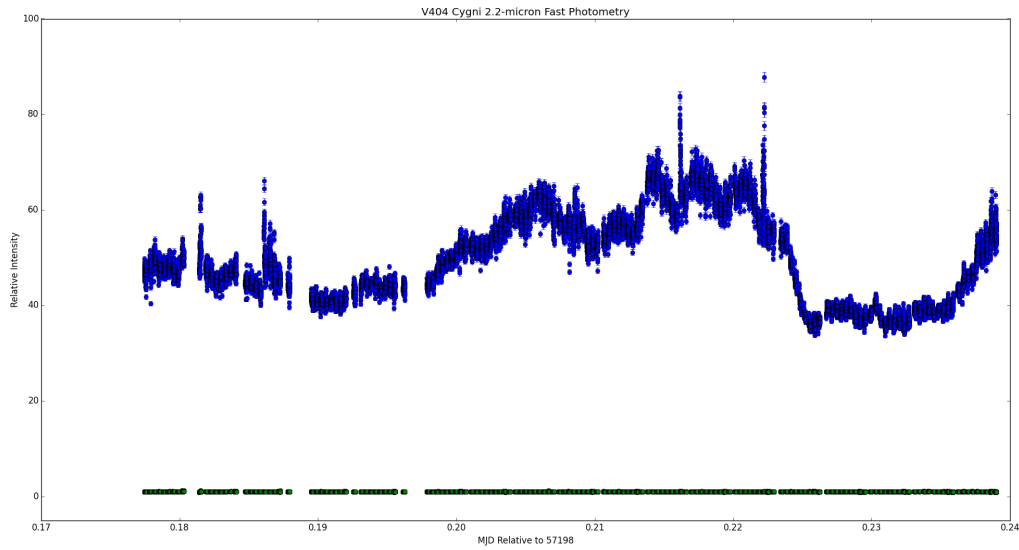


Figure 2 - CIRCE captured extreme infrared flaring activity from the black hole system V404 Cygni during an outburst in summer 2015. This is the first such outburst from V404 Cygni in more than 25 years. The rapid (sub-second) flares seen by CIRCE were unique observations among the world's telescopes, and are providing key insights into how black hole systems can power such huge outbursts. (Image courtesy of Yigit Dallilar and Alan Garner)

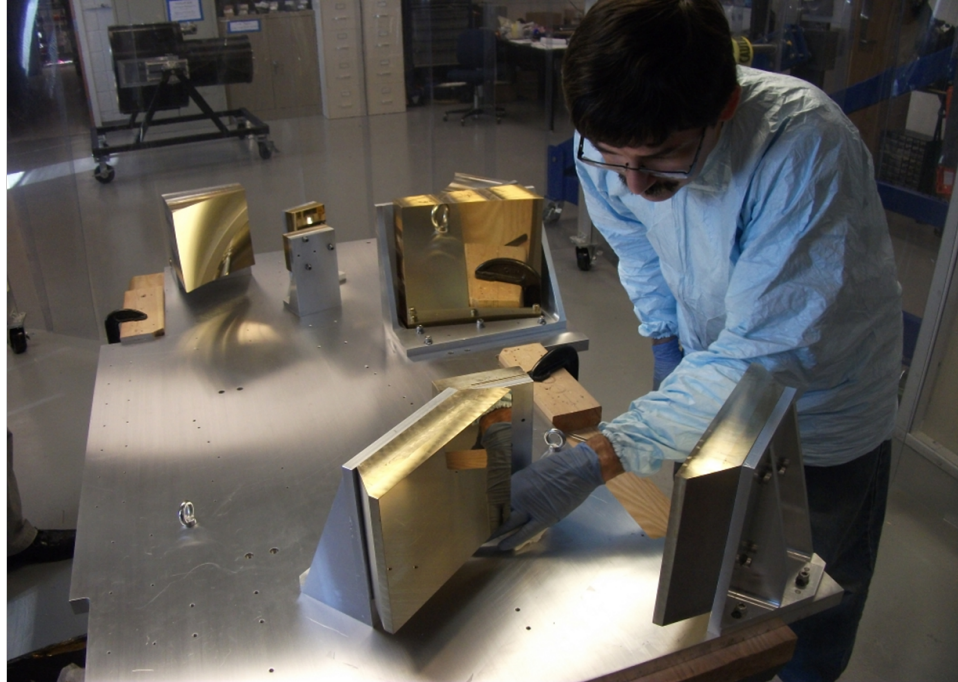


Figure 3 - UF scientist Dr. Nick Raines inspects the CIRCE camera's precision metal mirror optical system during the instrument's development in the UF Department of Astronomy.

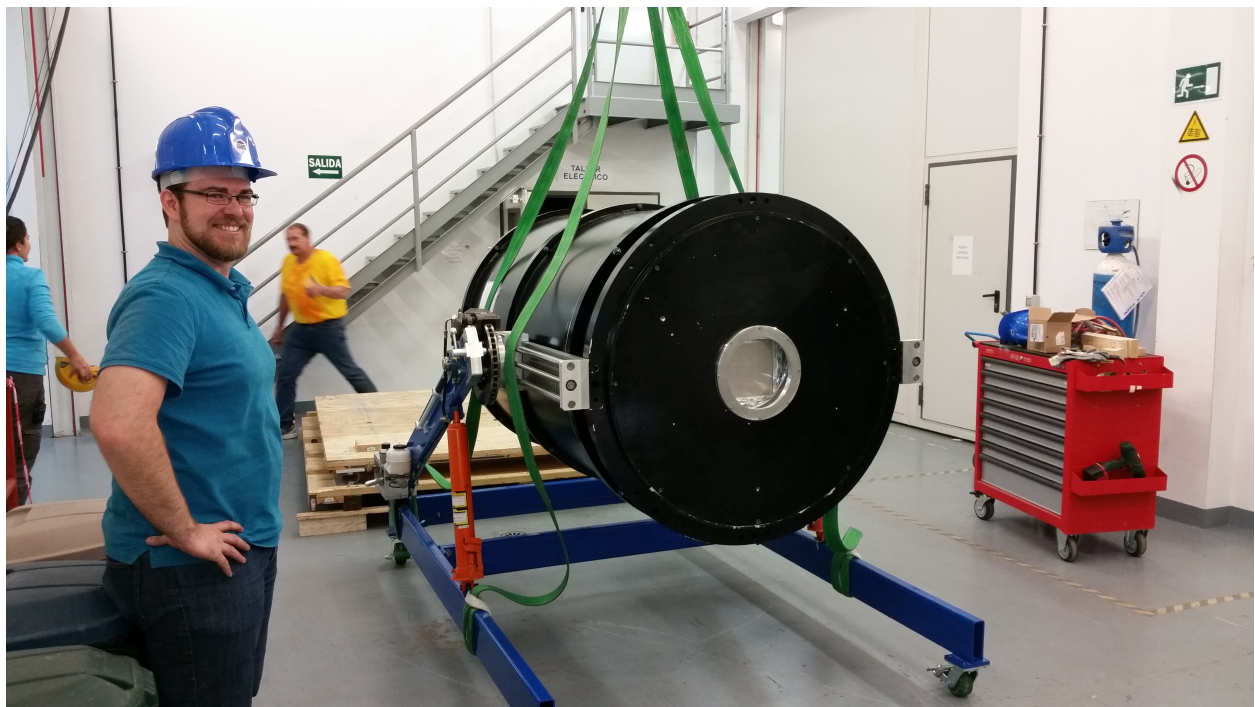


Figure 4 - UF astronomy graduate student Deno Stelter helps prepare the 1-ton CIRCE cryogenic camera system for installation on the Gran Telescopio Canarias.