Astronomers, royalty, rock stars to inaugurate world's largest telescope

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Four hundred years after Galileo first turned his handmade telescope toward the heavens, the world's largest, most technologically advanced telescope is set to make its formal debut.

The inauguration of the Gran Telescopio Canarias -- with its 10.4-meter diameter mirror, the telescope has more light-collecting area than any other — is scheduled for July 24 in Spain's Canary Islands. Officials and astronomers from the University of Florida, the only U.S. institution that is part of the project, will join more than 500 astronomers, journalists and celebrities in a ceremony presided over by Spain's King Juan Carlos I and Queen Sofia.

"The completion and inauguration of the GTC is a huge milestone for astronomy and for the University of Florida in collaboration with its partners in Spain and Mexico," UF Provost Joe Glover said. "We look forward to our astronomers playing a central role in the major discoveries this uniquely powerful telescope will enable."

Perched 7,874 feet above sea level on a mountain on the island of La Palma, the GTC has 6 square meters more light collecting area than any of the roughly one dozen 8- to 10-meter telescopes worldwide. With a mirror composed of 36 hexagonal segments thought to have the smoothest surfaces ever made, it is also the world's most technologically advanced optical telescope. Sensors keep the mirrors aligned to counteract the force of gravity, with the result that they act as a single surface, even as the telescope is rotated and aligned in place.

Spain owns 90 percent, Mexico 5 percent and UF 5 percent of the telescope under construction since 2000. UF contributed $5 million toward the $180 million project — and its astronomers designed and built one of the first two astronomical instruments for the telescope, a multimillion dollar heat-sensing camera called CanariCam.

Stan Dermott, chairman of UF's astronomy department, said the GTC's size and technical attributes enable it not only to gather more light than any other telescope, but also resolve the light into sharper and clearer focus. For astronomers, he said, those capabilities make it a powerful tool to study cosmic origins - the early days of the universe and the very early moments in the mysterious births of stars, planets and galaxies.

"The interpretation of the structure of the disks where new planets form is highly dependent on the quality of the image," he said, adding that the GTC also will enable the discoveries of new planets, possibly including the first habitable planet.

The telescope gathers the light, but only astronomical instruments can reveal the mysteries it contains. The car engine-sized CanariCam, built at UF but now in La Palma and expected to become operational next year, "sees" the infrared light — the invisible light that accompanies heat — emitted by stars and planets as they form in space. It also sees the light that, in its visible form, is obscured by the dust clouds and gas in space.

CanariCam is unique among mid-infrared cameras in its ability to determine the direction of polarized light and accomplish coronagraphy, which blocks the bright light of stars to make faint planets nearby more visible. Those abilities will help it reveal cool planets and more about the role of magnetic fields in planet and star formation, said Charles Telesco, UF astronomy professor and the principal investigator on the CanariCam project.

UF astronomer Eric Ford became one of the first astronomers worldwide to use the GTC earlier this year. Dermott said he anticipates that about 60 astronomy faculty, graduate students, postdoctoral associates and others — most of the members of the department — will become involved with GTC-related observations or research. He stressed that access to such a prominent telescope is key to success in astronomical research.

"All the objects we study are remote, and you have to get your information from looking at images," he said. "If the competition has a better image than you, you are basically out of business. So having the GTC puts our students and faculty on the front line."

There is far more demand for the world's largest telescopes than available nights, with the result that most astronomers get far less time than they want — and in some years, none at all. UF's part ownership of the GTC means that its astronomers are guaranteed 20 nights each year. UF'S instrument-building program will result in additional nights, as will UF astronomers' collaborations with Mexican and Spanish astronomers, Dermott said.

Brian May, lead guitarist of the rock group Queen and an astronomer himself, is expected to be among the celebrities present for the inauguration. 2009, the International Year of Astronomy, celebrates Galileo's first telescope observations in 1609.

Source: University of Florida (news : web)