

TUNING IN TO THE UNIVERSE!

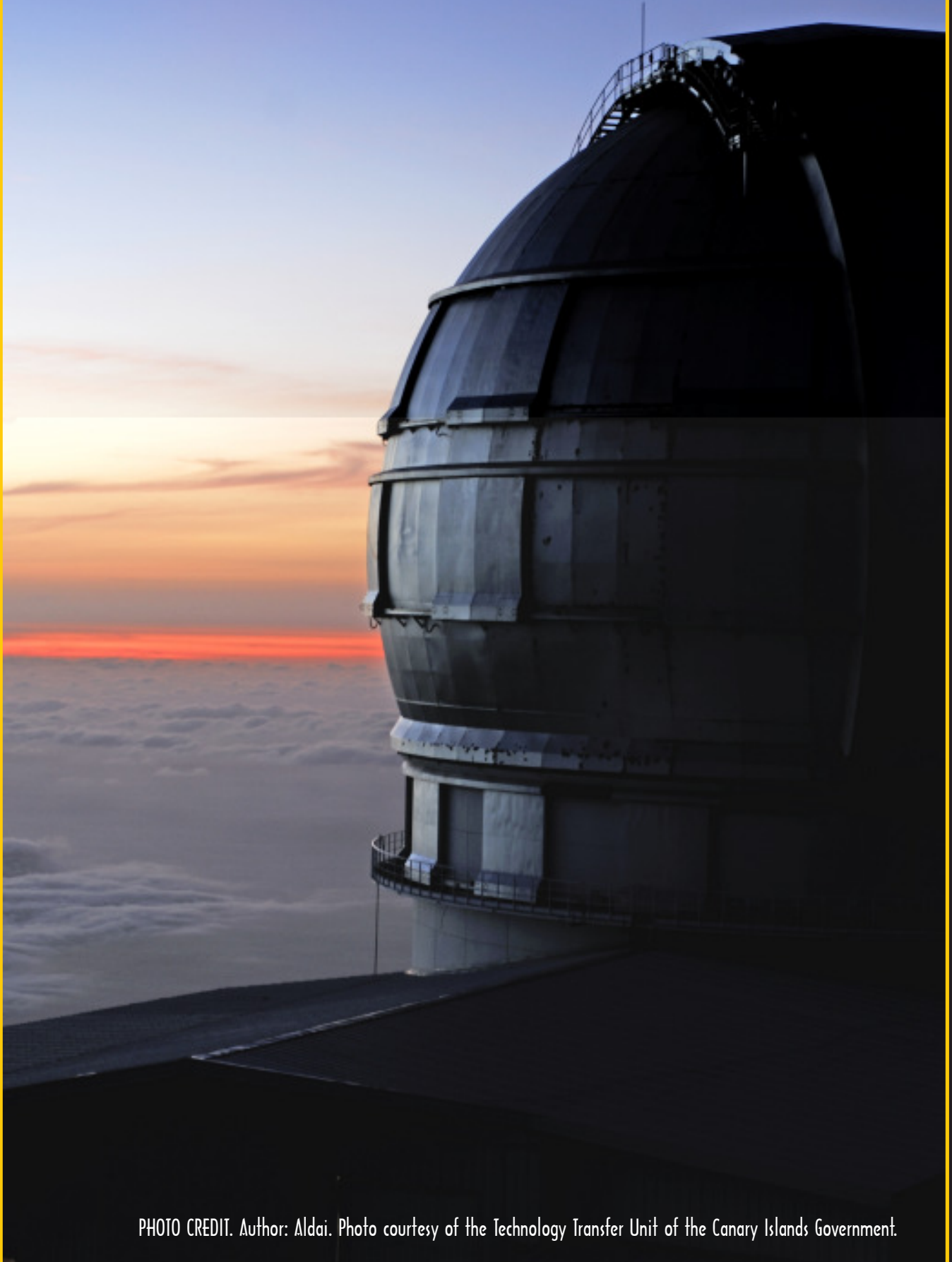


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TUNING IN TO THE UNIVERSE!

By NATALIA R. ZELMAN, IAC Director's Support Team

Here we are in the control room of the GTC (Gran Telescopio CANARIAS)... We are receiving direct emission from celestial bodies that is produced as electrons drop to lower energy levels, thereby emitting energy in the form of light. We observe three kinds of spectra: emission, absorption and continuum. Absorption occurs when an electron jumps from a lower to a higher energy level. The absorbed energy revealing itself as dark lines against the background continuum. Continuum emission is given off by all bodies that radiate heat. What's so important about emission lines and what have they got to do with the GTC?

When it comes into operation, the GTC will be one of the largest optical telescopes in the world, its segmented primary mirror equivalent to a circular aperture of diameter 10.4 metres.

But that won't be its only strong point. Together with its ability to reach back into cosmic time, enabling us to capture the light of objects hitherto too faint to be seen, the GTC will bring to bear new technology and scientific instrumentation that will open up new fields of research.

<<First light>> (the first detection by the telescope of starlight for calibration) is expected to take place at the end of 2006 or the beginning of 2007. The GTC will then enter its commissioning phase, in which adjustments will be made to the telescope and the first two scientific instruments: OSIRIS, now being built under the leadership of the Instituto de Astrofísica de Canarias (IAC), and Canari-Cam, being built by the Astronomy Department of the University of Florida (USA).

The telescope will be commissioned with a camera built for calibration purposes. It will be a simple instrument and will be used to check the proper working of the telescope and its various systems. Built in Mexico by the IA-UNAM (Instituto de Astronomía de la Universidad Nacional Autónoma de México), it will calculate the correct position and alignment of

the primary mirror segments to ensure that it forms a single surface; it will also measure the position of the secondary mirror with respect to the primary.

All the segments that will eventually make up the primary mirror (36 to form the mirror itself plus six spares) are now in La Palma, together with the secondary and tertiary mirrors. A mock primary with dummy segments is now being assembled as a dry run for the eventual mounting of the real segments, which is expected to take place in early December.

The movement of the telescope on both its elevation and azimuthal axes is also being tested, along with the control system. The instrument de-rotators, whose function is to compensate for the rotation of the Earth in the focal plane, are already mounted and are in their final phase of testing.

<<Day One>> (when the telescope will commence its active scientific life in the service of the astronomical community) is expected to take place at the end of 2007 or the beginning of 2008. So this Canary Islands Winter School of Astrophysics is taking place at an important moment in the building of the GTC, which will provide observations for numerous scientific programmes, including the study of emission-line objects, the subject of this year's School.