

The two Gemini Multi-Object Spectrographs are twin instruments that have been supplied to both Gemini telescopes. GMOS was a collaborative project between the UK ATC, Durham University and the Dominion Astrophysical Observatory, Canada. It is a versatile instrument for optical spectroscopy.



As a multi-object spectrograph, GMOS is capable of obtaining dozens of spectra in one 'snapshot'. The ability to deliver high-resolution images is a secondary function. Combined with Gemini's 8-metre mirrors, it is possible to study galaxies and galaxy clusters at vast distances – distances so great that the light has travelled for half the age of the Universe or more before reaching Earth. This capability presents unprecedented possibilities for investigating how galaxies formed and evolved in the early Universe.

GMOS achieves remarkable sensitivity partly because of the use of technologically advanced detector assembly, with active compensation for temperature and flexure, and over 28 million very sensitive pixels, and partly because of the many innovative features of the Gemini domes and telescopes that reduce local atmospheric distortions.

The fine image scale of GMOS exploits the exceptional image

quality from the state-of-the-art active optics systems on the Gemini telescopes.

Specifications

GMOS has four main observing modes:

- direct imaging.
- long-slit spectroscopy (generating spectra of thousands of contiguous points over 5.5 arcminutes long on the sky).
- multi-slit spectroscopy using custom-made masks (generating simultaneous spectra of many objects separated by up to 5.5 arcminutes on the sky).
- integral-field spectroscopy (generating independent spectra simultaneously of a two-dimensional array of contiguous positions on the sky).



Gemini/AURA

Gemini North

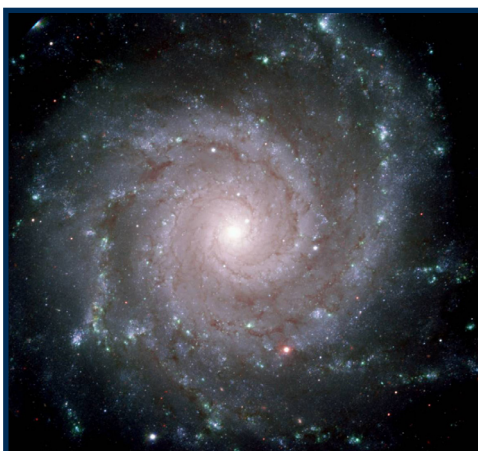
- integral-field spectroscopy of distant galaxies, to study their kinematics, star formation and the distribution of obscuring dust clouds

The two GMOS instruments were commissioned in Hawaii and Chile in 2001 and 2002. The GMOS project demonstrates the advantages of building two near-identical instruments for the twin telescopes. The result is the ability to coherently study and take deep spectra of any object in the Northern or Southern sky at optical wavelengths. For the first time the Gemini twins act as one.

Science

Examples of the many studies this instrument will support are:

- surveys through nature's own lenses – foreground clusters of galaxies which gravitationally amplify faint galaxies in the distant Universe that would otherwise be beyond reach
- studies of the distribution of the elusive 'dark matter' in nearby galaxies, and of the relationship between galaxies and the super-massive black holes at their centres



'Perfect Spiral' – GMOS N first light image NGC628

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