

For more information on NIFS, please see the following Web pages:

<http://www.gemini.edu/sciops/instruments/nifs/NIFSIndex.html>

<http://www.mso.anu.edu.au/nifs/description/index.shtml>

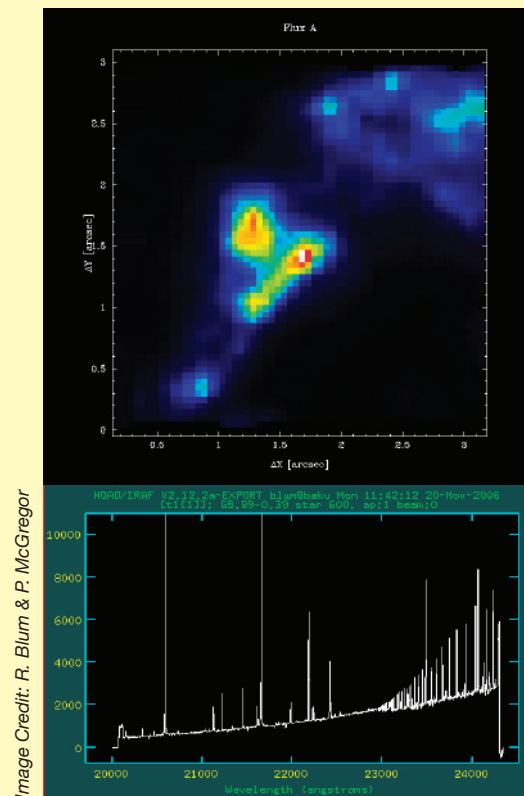


Image Credit: R. Blum & P. McGregor

NIFS Brackett Gamma image (top) and full spectrum for a 0.2-arc-second-diameter aperture near the image center. Lines of H, He, H<sub>2</sub>, and [FeII] are evident in this spectrum of the Galactic Ultra Compact HII region G5.89-0.39

# NIFS

## Near infrared Integral Field Spectrograph



*NIFS as deployed on the up-looking port of the Frederick C. Gillett 8-m telescope at Gemini North.*

*Offered at **Gemini North***

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Queries for Gemini-specific issues should be directed to the  
Gemin HelpDesk at:

<http://www.gemini.edu/sciops/helpdesk/helpdeskIndex.html>



## Instrument Properties

**Detector** 2048×2048 HAWAII 2RG by Rockwell Scientific. The detector is sensitive to light over 1–2.5 microns, and has 18 micron pixels.

The NIFS detector can be operated in bright object, medium brightness, and faint objects modes. These three modes deliver readout noise of 18, 9, and 6 electrons respectively for full array reads and minimum exposure times of 5, 21, and 85 seconds. The NIFS dark current is 0.01 electrons per second.

**Gratings** NIFS deploys four gratings on a rotating turret to provide  $R=5300$  (two pixel) spectra covering one each of the entire the Z, J, H, and K bands. The grating central wavelength may be adjusted for programs that require coverage in between the standard telluric transmission windows.

**Field of View** The NIFS field covers 3 by 3 arcseconds on the sky. The heart of the instrument is a fully cryogenic and reflective image slicer which splits the field into 29 slices on the sky. Each 0.1 arcsecond slice is re-imaged onto the detector providing a spectral image with 0.043 arcsecond pixels. The resulting data cube thus has 2048 spectral pixels over a contiguously sampled (0.1 by 0.043 arcseconds) 3 arcsecond field.

**Focal Plane Masks** For bright object spectroscopy, NIFS has two focal plane spots that can be used to reduce the amount of light entering the spectrometer. These round masks have diameters of 0.2 and 0.5 arcseconds.

**Adaptive Optics** NIFS is designed to nearly critically sample the diffraction limit on the Gemini 8-m telescope. Thus, the instrument is almost always used with the facility AO module, Altair. NIFS has been commissioned with natural guidestar (NGS) AO and with the laser guide star (LGS). The former mode requires an  $R < 15$  mag star (12 for full correction) within 25 arcseconds while the latter requires an  $R < 18$  mag star within 25 arcseconds (for tip-tilt correction).

**Guiding Options** Apart from AO which is generally recommended, NIFS can be used with the peripheral wavefront sensors (in the case where no AO guide star is available) and also in conjunction with the on-instrument wave front sensor (OIWFS) to reduce flexure between Altair and the detector. This can be important when using the focal plane masks so that the star remains precisely centered behind the spot.

**Telescope** Gemini North

NIFS was built at the Australian National University for Gemini  
(PI: Peter McGregor)