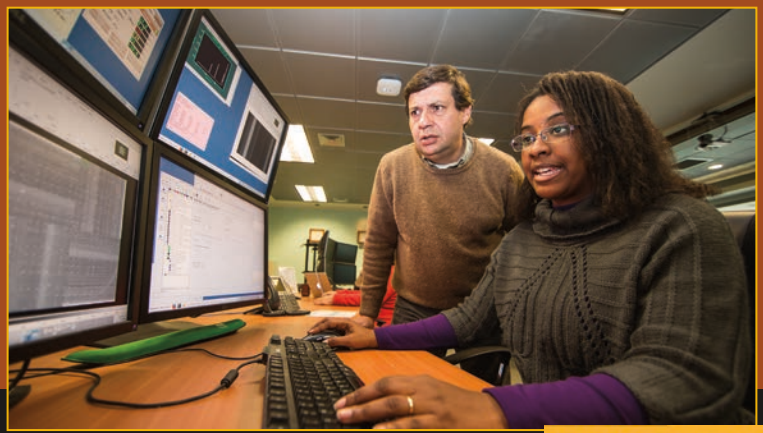
Gemini Capabilities





GEMINI OBSERVATORY

Exploring the Universe, Sharing its Wonders

http://www.gemini.edu/caps-pdf

2019

Gemini South

Gemini Multi-Object Spectrograph

GMOS-S

- Broad/Narrow band optical imaging
- (5.5′ × 5.5′ FOV), long slit, multi-object and integral field spectroscopy (0.36 –1.03 µm)
- Nod and Shuffle spectroscopic mode (all modes including IFU)
- Spectral resolutions ~ 150 – 8700 in 1st order
- Detector array populated by 3 Hamamatsu fully depleted CCDs

Gemini Planet Imager

GPI

- Extreme AO system for integral field spectroscopy and polarimetry
- Diffraction-limited images 0.9 – 2.4 µm over 2.8″ × 2.8″ FOV, sampling 14 milliarcseconds
- Spectral resolution in H band is R ~ 40
- Coronography with contrast of ~ 10^{-5} at 0.4″ radius

Gemini South Adaptive Optics Imager

GSAOI

- Near-infrared imager used with GeMS
- 85″ × 85″ FOV, sampling 20 milliarcseconds
- 22 narrow and broad-band filters covering 0.9 – 2.5 µm
- Diffraction limited imaging

FLAMINGOS-2 Near-Infrared Imager/Spectrograph

FLAMINGOS-2

- Near-infrared imager (6.1′ diameter FOV)
- Long slit spectroscopy (0.9 –2.4 µm)
- Spectral resolutions: ~ 300– 4500
- Ongoing commissioning of multi-object spectrograph mode (2′ × 6′ FOV)

Gemini Multi-Conjugate Adaptive Optics System

GeMS

- Multi-conjugate adaptive optics system uses multiple deformable mirrors, five laser guide stars, and three natural guide stars
- High Strehl ratios and spatial resolution up to FWHM ~ 0.06″ over 1.4′ x 1.4′ FOV
- Currently used with GSAOI, with other instrument options possible in the future

Gemini High Resolution Optical Spectrograph

GHOST

- Two target simultaneous spectroscopy over a 7.5′ field, at spectral resolution >50000
- Single target spectroscopy at spectral resolution >75000
- Incremented accuracy up to ~ 10 m/s within 0.43– 0.75 µm
- Commissioning in 2020

Learn more about instrument capabilities at:

Gemini North

Gemini Multi-Object Spectrograph

GMOS-N

- Broad/Narrow band optical imaging (5.5′ × 5.5′ FOV); long-slit, multi-object and integral field spectroscopy (0.36 –1.03 µm)
- Nod and Shuffle in long-slit and MOS spectroscopic modes
- Spectral resolutions ~ 150 – 8700 in 1st order
- Detector array populated by 3 Hamamatsu fully depleted CCDs

Near-Infrared Integral Field Spectrograph

NIFS

- Near-infrared (0.95 – 2.4 µm) integral field spectrograph and coronagraphic imager (3″ × 3″ FOV)
- Spectral resolution ~ 5000
- Spatially resolved spectroscopy on 0.15″ scales with Altair adaptive optics system

Gemini Near-Infrared Spectrograph

GNIRS

- Near-infrared (0.8 – 5.4 µm) long-slit and cross-dispersed spectroscopy
- Spectral resolutions: ~ 1200– 18000 in long-slit mode
- Cross-dispersed spectroscopy delivering complete 0.8 – 2.5 µm coverage at R ~ 1700 and partial coverage at higher resolution

Near-Infrared Imager

NIRI

- Near-infrared imager with three cameras
- 22″ × 22″, 51″ × 51″, or 120″ × 120″ FOV
- Wavelength coverage from 1 – 5 µm with 8 broad-band and 21 narrow-band filters
- Angular resolution up to FWHM ~ 0.08″ with Altair adaptive optics system

Altair Adaptive Optics System

Altair

- Natural guide star mode, FWHM ~ 0.07″ with Strehl ratios up to 40%
- Laser guide star mode, FWHM ~ 0.08″ with Strehl ratios up to 20%
- Used in conjunction with GNIRS, NIFS, or NIRI
- Future integration with GMOS
- Nearly full sky coverage using LGS+P1 “super seeing“ mode yields FWHM ~ 0.3″

Gemini Remote Access to CFHT ESPaDOnS Spectrograph

GRACES

- 270-meter fiber optic cable feeds the echelle spectrograph at the Canada France Hawai‘i
- Wavelength coverage: 0.4 –1.0 µm continuous
- Spectral resolutions: 40,000 (target and sky observed simultaneously), 68,000 (target only)

http://www.gemini.edu/caps-instr

Expanding Flexibility
New Proposing and Observing Modes

Learn more about Gemini's observing modes at:
http://www.gemini.edu/caps-modes

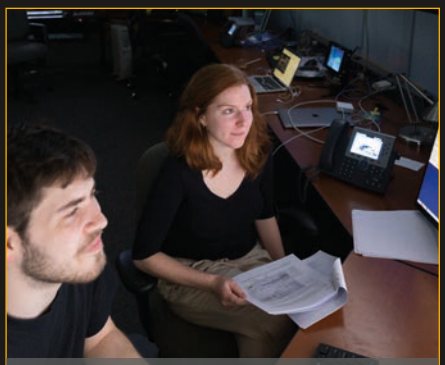
Fast Turnaround Programs

The Fast Turnaround program accepts proposals for both telescopes. Proposals are solicited each month and reviewed by other proposers during that round. PIs are notified within three weeks of the outcome, and accepted programs are observed within one to four months of initial proposal submission.

This innovative mode uses up to 10% of available observing time at each telescope. Your proposals and feedback will continue to improve our process.



H. Dahle, M. D. Gladders, K. Sharon, M. B. Bayliss, J. R. Rigby


GOGREEN PV Observers

Priority Visitor Observing Mode

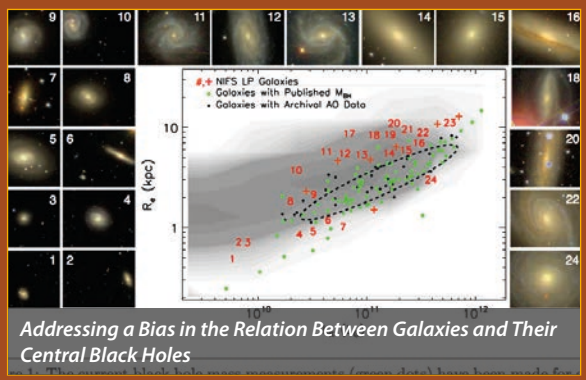
Priority Visitor (PV) observing mode allows Band 1 PIs (or team members) to visit Gemini prepared to observe their program if the conditions are good enough (or better) than required. If not, the PI will execute other approved queue programs. Any unobserved portions of the PI's program can then be executed within the regular queue. PV mode is the default for Band 1 Large/Long programs and may also be requested by other PIs.

http://www.gemini.edu/caps-pv

Large and Long Programs

Large and Long Programs occupy up to 20% of Gemini observing time of the participating partners (United States and Canada). These programs require significantly more time than is typically approved for a single program, or extend over two to six semesters, or both. PIs must be based in an institution of one of the participating countries, but there is no restriction on Co-Investigator affiliations.

The annual announcement of opportunity is issued late each year, with Letters of Intent due in early February and proposals due in early April, for observations to begin in the subsequent B semester.



Addressing a Bias in the Relation Between Galaxies and Their Central Black Holes


'Alopeke installation

Gemini Welcomes Visiting Instruments

Visiting Instruments expand the capabilities we offer to all users. Outstanding results have been produced by instruments such as GRACES, 'Alopeke, Phoenix, TEXES and IGRINS. We offer new and exciting capabilities almost every semester, so remember to check the call for proposals (available at the end of February and August each year) to see what new instruments you can use for your science, and if you have an instrument you would like to bring to Gemini, contact us at gemini-vip@gemini.edu.

The Gemini Observatory is operated by the Association of Universities for Research in Astronomy, Inc. (AURA), under a cooperative agreement with the National Science Foundation (NSF) on behalf of the Gemini Partnership.