
GNAO: the new AO facility for Gemini North, facility overview and project updates

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Abstract

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The Gemini North Adaptive Optics (GNAO) facility is the upcoming AO facility for Gemini North providing a state-of-the-art AO system for surveys and time domain science in the era of JWST and Rubin operations. GNAO will be optimized to feed the Gemini infrared Multi Object Spectrograph (GIRMOS). While GIRMOS is the primary science driver for defining the capabilities of GNAO, any instrument operating with an f/32 beam could be deployed using GNAO. The GNAO project includes the development of a new laser guide star facility which will consist of four side launched laser beams supporting the two primary AO modes of GNAO: a wide-field mode providing an improved image quality over natural seeing for a 2-arcminute circular field-of-view using GLAO and a narrow-field mode providing near diffraction-limited performance over a 20×20 arcsecond square field-of-view using LTAO.

The GNAO wide field mode will enable GIRMOS's multi-IFU configuration in which the science beam to each individual IFU will be additionally corrected using multi-object AO within GIRMOS. The GNAO narrow field mode will feed the GIRMOS tiled IFU configuration in which all IFUs are combined into a "super"-IFU in the center of the field. GNAO will include a new Real Time Controller (RTC), Facility System Controller and new Adaptive Optics Bench, each at different stages of their development lifecycle.

We present an overview of the GNAO facility, its science goals and provide a status update of the development of each facility product.

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