

## Ground-Based Direct Detection of Exoplanets with the Gemini Planet Imager (GPI)

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The Gemini Planet (GPI) imager is an "extreme" adaptive optics system being designed and built for the Gemini Observatory. GPI combines precise and accurate wavefront control, diffraction suppression, and a speckle-suppressing science camera with integral field and polarimetry capabilities. GPI's primary science goal is the direct detection and characterization of young, Jovian-mass exoplanets. For systems younger than 2 Gyr exoplanets more massive than six jupiter masses and with semimajor axes greater than 10 AU are detected with completeness greater than 50%. GPI will also discover faint debris disks, explore icy moons and minor planets in the solar system, reveal high dynamic range main-sequence binaries, and study mass loss from evolved stars. First light is expected in late 2010. This work has been supported by the National Science Foundation Science and Technology Center for Adaptive Optics, managed by the University of California at Santa Cruz under cooperative agreement No. AST - 9876783.