

GPI 2.0: Upgrade of the Gemini Planet Imager

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The Gemini Planet Imager (GPI) is a dedicated high-contrast imaging facility instrument designed for the direct detection and characterization of young Jupiter mass exoplanets. After six years of operation at Gemini South, GPI has helped establish that the occurrence rate of Jovian planets peaks near the snow line (~ 3 AU) and falls off toward larger separations. This motivates an upgrade of GPI to achieve deeper contrasts, especially at small inner working angles, to extend GPI's operating range to fainter stars, and to broaden its scientific capabilities, all while leveraging its historical success. GPI was packed and shipped from Gemini South in 2022 and is currently undergoing a major science-driven upgrade as part of a relocation to Gemini North. We present the status of the upgrades including replacing the current Shack-Hartman wavefront sensor with an EMCCD-based pyramid wavefront sensor, adding a broadband low spectral resolution prism operating from Y-K band, new apodized-pupil Lyot coronagraph designs, upgrades of the calibration wavefront sensor and increased queue operability. Further we discuss the progress of reintegrating these components into the new system and the expected performance improvements in the context of GPI 2.0's enhanced science capabilities and in the context of future large scale direct imaging surveys with GPI 2.0. GPI 2.0 is expected to be shipped to Gemini North in 2024 and is expected to go on-sky in 2025.