Differential Phase Interferometry with the Keck Telescopes

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The Keck Interferometer will begin Differential-Phase (DP) observations in mid-2004. The measurement of multicolor fringe phases in the 1.5-4.2 micron wavelength range will allow a new and powerful astrophysical probe. With better than 0.1 mrad phases, the interferometer may be able detect irradiance from the so-called Hot-Jupiter or ``Roaster'' class of extrasolar giant planets. At JPL, we have developed and are testing a precision fringe measurement engine that will enable these sensitive measurements. In this article we briefly discuss DP and other related techniques, describe the instrument and the results of laboratory testing before deployment at Mauna Kea. We also give a synopsis of systematic error sources the will plague real observations, along with our proposed methodology for calibrating these in order to extract the astrophysical signal.