

**Title:** The First Extrasolar Planet Discovered with A New Generation High Throughput Doppler Instrument

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## Abstract

We report the first extrasolar planet, ET1, detected with a new generation Doppler instrument, called Exoplanet Tracker. This planet has a minimum mass of 0.41 Jupiter masses and orbits a  $V = 8.1$  K0V star with a 4.8 day period. The planet was identified using the KPNO Coude Feed 0.9 meter telescope in spring 2005. This is the first time an extrasolar planet around a star fainter than  $V=8$  magnitude has been discovered with an under 1 meter size astronomical telescope and Doppler instrument. This planet discovery is possible due to the extremely high throughput of the instrument, nearly 50% measured from the fiber output end to the detector.

This discovery enables a new generation radial-velocity survey that could detect thousands of exoplanets using multiple-object versions of the ET instruments, called the W.M. Keck Exoplanet Tracker, at large wide-field telescopes in 2006-2020. A prototype multiple object ET has already demonstrated a 25 object capability for precision Doppler measurements at the Sloan telescope in early 2005. The ET instrument design is based on dispersed fixed-delay interferometry (Ge 2002), which is evolved from the earlier **externally dispersed interferometry** (Erskine and Ge 2000; Ge, Erskine and Rushford 2002) and the Global Oscillation Net Work (GONG) interferometry (Barker & Hollenbach 1972; Gorskii & Lebedev 1977; Beckers & Brown 1978; Harvey et al., 1988; Harvey 2002 private communications).

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