



The First Kepler Mission Planet Confirmed With The Hobby-Eberly Telescope: Kepler-15b, a Hot Jupiter Enriched In Heavy Elements

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We report the discovery of Kepler-15b, a new transiting exoplanet detected by NASA's Kepler mission. The transit signal with a period of 4.94 days was detected in the quarter 1 (Q1) Kepler photometry. For the first time, we have used the High-Resolution-Spectrograph (HRS) at the Hobby-Eberly Telescope (HET) to determine the mass of a Kepler planet via precise radial velocity (RV) measurements. The 24 HET/HRS radial velocities (RV) and 6 additional measurements from the FIES spectrograph at the Nordic Optical Telescope (NOT) reveal a Doppler signal with the same period and phase as the transit ephemeris. We used one HET/HRS spectrum of Kepler-15 taken without the iodine cell to determine accurate stellar parameters. The host star is a metal-rich ($[Fe/H]=0.36\pm 0.07$) G-type main sequence star with $T_{\text{eff}}=5515\pm 124$ K. The amplitude of the RV-orbit yields a mass of the planet of $0.66\pm 0.1 M_{\text{Jup}}$. The planet has a radius of $0.96\pm 0.06 R_{\text{Jup}}$ and a mean bulk density of $0.9\pm 0.2 \text{ g/cm}^3$. The planetary radius resides on the lower envelope for transiting planets with similar mass and irradiation level. This suggests significant enrichment of the planet with heavy elements. We estimate a heavy element mass of 30-40 M_{Earth} within Kepler-15b.

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