

[구KMT-03] 외계행성 탐색시스템 데이터베이스

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한국천문연구원은 2009년부터 지구형 외계행성을 검출하기 위한 외계행성 탐색시스템 (KMTNet: Korea Microlensing Telescope Network) 개발 사업을 수행하고 있다. KMTNet은 칠레, 호주, 남아프리카 공화국에 설치할 광시야 망원경으로 은하 중심부를 24시간 연속 관측을 하고 600GB/1일의 관측 자료가 산출된다. 이 발표에서는 KMTNet에 필요한 데이터베이스의 사양을 설명하고 실제 관측 자료를 이용하여 자료 표출 방법 및 최적의 성능을 얻기 위한 실험 결과 등을 제시한다.

[구KMT-04] Physical Properties of Transiting Planetary System TrES-3

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We present four new transits of the planetary system TrES-3 observed between 2009 May and 2010 June. Among those, the third transit by itself indicates possible evidence for brightness disturbance, which could originate from a starspot or an overlapping double transit. A total of 107 transit times, including our measurements, were used to determine the improved ephemeris with a transit epoch of $2454185.910950 \pm 0.000073$ HJED (Heliocentric Julian Ephemeris Date) and an orbital period of $1.30618698 \pm 0.00000016$ d. We analyzed the transit light curves using the JKTEBOP code and adopting the quadratic limb-darkening law. In order to derive the physical properties of the TrES-3 system, the transit parameters are combined with the empirical relations from eclipsing binary stars and stellar evolutionary models, respectively. The stellar mass and radius obtained from a calibration using T_{eff} , $\log \rho$ and $[\text{Fe}/\text{H}]$ are in good agreement with those from the isochrone analysis within the uncertainties. We found that the exoplanet TrES-3b has a mass of $1.93 \pm 0.07 M_{\text{Jup}}$, a radius of $1.30 \pm 0.04 R_{\text{Jup}}$, a surface gravity of $28.2 \pm 1.1 \text{ m s}^{-1}$, a density of $0.82 \pm 0.06 \rho_{\text{Jup}}$, and an equilibrium temperature of 1641 ± 23 K.