A homogeneous Transit Timing analysis with combined ground- and space-based photometry

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Abstract

The analysis of the timing variations of transiting exoplanets allows one to discover additional planets in the system. Such bodies can be very low in mass and radius, so that they remain undetected by transit or radial velocity methods.

The CoRoT satellite looks back on six years of high precision photometry of a very high number of stars. Thousands of transiting events are detected from which 25 were confirmed to be transiting planets so far.

In my research I search and analyze Transit Timing Variations in the CoRoT sample and combine the unprecedented precision of the light curves with ground-based follow-up photometry. Because CoRoT can observe transiting planets only for a maximum duration of 150 days the ground-based follow-up can help to refine the ephemeris. As first example is presented here.
TrES-2 is one of the few exoplanets, which offers the unique possibility to combine long-term ground-based observations with continuous satellite data. The homogeneous analysis of 31 individual ground-based transits of TrES-2 together with 435 high-precision light curves of the Kepler space telescope and 11 publicly available ground-based light curves is described as an example for the analysis of the CoRoT planets.

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