

# Algorithmische Geschichte und Philosophie der Wissenschaften, Vorl 7

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# Begriffserkennung

| IDabstr | IDsentence | sentence  |
|---------|------------|---|
| 14500   | 0          | We analyzed the Kepler light curves of four transiting hot Jupiter systems—KOI-13, HAT-P-7, TrES-2, and Kepler-76, which show BEaming, Ellipsoidal, and Reflection (BEER) phase modulations.  |
| 14500   | 1          | The mass of the four planets can be estimated from either the beaming or the ellipsoidal amplitude, given the mass and radius of their parent stars.  |
| 14500   | 2          | For KOI-13, HAT-P-7, and Kepler-76 we find that the beaming-based planetary mass estimate is larger than the mass estimated from the ellipsoidal amplitude, consistent with previous studies.   |
| 14500   | 3          | This apparent discrepancy may be explained by equatorial superrotation of the planet atmosphere, which induces an angle shift of the planet reflection/emission phase modulation, as was suggested for Kepler-76 in the first paper of this series. |
| 14500   | 4          | We propose a modified BEER model that supports superrotation, assuming either a Lambertian or geometric reflection/emission phase function, and provides a photometry-consistent estimate of the planetary mass.                                    |
| 14500   | 5          | Our analysis shows that for Kepler-76 and HAT-P-7, the Lambertian superrotation BEER model is highly preferable over an unshifted null model, while for KOI-13 it is preferable only at a $1.4\sigma$ level.  |
| 14500   | 6          | For TrES-2 we do not find such preference.  |
| 14500   | 7          | For all four systems the Lambertian superrotation model mass estimates are in excellent agreement with the planetary masses derived from, or constrained by, radial velocity measurements.  |
| 14500   | 8          | This makes the Lambertian superrotation BEER model a viable tool for estimating the masses of hot Jupiters from photometry alone.   |
| 14500   | 9          | We conclude that hot Jupiter superrotation may be a common phenomenon that can be detected in the visual light curves of Kepler.  |

Figure: Abstract 14500

## Attribute

EmpiricalData Kepler light curves

## ModelDescription transiting hot Jupiter systems

ObjectName KOI-13, HAT-P-7, TrES-2, and Kepler-76

## EmpiricalData BEaming, Ellipsoidal, and Reflection (BEER) phase modulations

**ModelAttribute** The mass of the planet

EmpiricalData/ModelAttribute beaming or the ellipsoidal  
amplitude

ModelAttribute mass and radius of their parent stars.

ModelAttribute equatorial superrotation of the planet atmosphere

**ModelAttribute** angle shift of the planet reflection/emission phase modulation

ModelDescription Lambertian superrotation BEER model

EmpiricalData radial velocity measurements

## ModelDescription hot Jupiter superrotation

## Kategorien

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# Kategorien

Parser