**J/A+A/575/L15** TrES-4b RV and Ic curves (Sozzetti+, 2015)

The GAPS programme with HARPS-N at TNG. VI. The curious case of TrES-4b.
Sozzetti A., Bonomo A.S., Biazzo K., Mancini L., Damasso M., Desidera S., Gratton R., Lanza A.F., Poretti E., Rainer M., Malavolta L., Affer L., Barbieri M., Bedin L.R., Boccato C., Bonavita M., Borsa F., Ciceri S., Claudi R.U., Gandolfi D., Giacobbe P., Henning T., Knapic C., Latham D.W., Lodato G., Maggio A., Maldonado J., Marzari F., Martinez Fiorenzano A.F., Micela G., Molinari E., Mordasini C., Nascimbeni V., Pagano I., Pedani M., Pepe F., Piotto G., Santos N., Scandariato G., Shkolnik E., Southworth J.
<Astron. Astrophys., 575, L15-15 (2015)>
=2015A&A...575L..15S

**ADC_Keywords:** Stars, double and multiple ; Planets ; Photometry ; Radial velocities
**Keywords:** stars: individual: TrES-4b - planetary systems - techniques: radial velocities - techniques: spectroscopic - techniques: photometric

**Abstract:**
We update the TrES-4 system parameters using high-precision HARPS-N radial-velocity measurements and new photometric light curves. A combined spectroscopic and photometric analysis allows us to determine a spectroscopic orbit with a semi-amplitude K=51±3m/s. The derived mass of TrES-4b is found to be $M_p$=0.49±0.04$M_{Jup}$, significantly lower than previously reported. Combined with the large radius ($R_p$=1.84$_{-0.09}^{+0.08}R_{Jup}$) inferred from our analysis, TrES-4b becomes the transiting hot Jupiter with the second-lowest density known. We discuss several scenarios to explain the puzzling discrepancy in the mass of TrES-4b in the context of the exotic class of highly inflated transiting giant planets.

**Description:**
The TrES-4 system was observed with HARPS-N on 17 individual epochs between March 2013 and July 2014.
We carried out Ic-band precision photometric observations of two complete transit events of TrES-4 b with the CAHA 1.23-m on UT 2013 July 6 and UT 2014 June 30.

**Objects:**

| RA (2000) | DE | Designation(s) |
|---|---|---|
| 17 53 13.06 | +37 12 42.4 | TrES-4b = NAME TrES-4b |

**File Summary:**

| FileName | Lrecl | Records | Explanations |
|---|---|---|---|
| ReadMe | 80 | . | This file |
| table1.dat | 39 | 17 | HARPS-N systemic radial velocities, formal errors, bisector spans, and chromospheric activity index of TrES-4 |
| table3.dat | 29 | 454 | Differential photometry of TrES-4 (Ic band, CAHA 1.23-m) |

**See also:**
J/A+A/554/A28 : Qatar-1 differential light curve (Covino+, 2013)
J/A+A/575/A111 : GAPS. V: Global analysis of the XO-2 system (Damasso+, 2015)

**Byte-by-byte Description of file:** table1.dat

| Bytes | Format | Units | Label | Explanations |
|---|---|---|---|---|
| 1- 11 | F11.6 | d | BJD | Barycentric JD for the midpoint of observation (TDB) (BJD-2450000) |
| 13- 19 | F7.3 | km/s | gamma | Systemic radial velocity γ |
| 21- 25 | F5.3 | km/s | e_gamma | rms uncertainty on gamma |
| 27- 32 | F6.3 | km/s | BS | Bisector Span |
| 34- 39 | F6.3 | [-] | logR'HK | [-5.4/-5.0] Chromospheric activity index |

**Byte-by-byte Description of file:** table3.dat

| Bytes | Format | Units | Label | Explanations |
|---|---|---|---|---|
| 1- 11 | F11.6 | d | BJD | Barycentric JD for the midpoint of observation (TDB) (BJD-2450000) |

```
  13- 20  F8.6  ---     Rflux     [0.9875/1.0021] Relative Ic flux
  22- 29  F8.6  ---     e_Rflux   [[0.0007/0.0009] rms uncertainty on mag
```

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**History:**
From electronic version of the journal

**References:**

Covino et al., Paper I 2013A&A...554A..28C, Cat. J/A+A/554/A28
Desidera et al., Paper II 2013A&A...554A..29D
Esposito et al., Paper III 2014A&A...564L..13E
Desidera et al., Paper IV 2014A&A...567L...6D
Damasso et al., Paper VII 2015A&A...575A.111D, Cat. J/A+A/575/A111

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**(End)** Patricia Vannier [CDS] 03-Jun-2015

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