

# A layperson's guide to Kepler data.

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## Introduction.

The following two tables are defined for an [API](#) provided at the [NASA Exoplanet Archive](#). I am a layperson and a web developer. I recently participated in the [International Space Apps Challenge](#) and wrote [a very basic Kepler application](#). I'd like to write a better one, but I didn't understand the data available to me. This is a list of the columns provided in both tables with further explanations and links for more information (the initial descriptions are provided by the [API](#) documentation). If a column has no explanation, then I either considered it obvious or not related to the information I need (I assume!).

What I would like to know about new planets is:

1. The position of, and distance to, the host star.
2. The planet's distance from its host star.
3. The mass of the planet compared to ours.
4. The size of the planet compared to ours.
5. The composition of the planet.
6. Whether or not the planet's orbit is in the "[habitable zone](#)" of the host star. There's some marked criticism on the validity of the metric, though.

## Interesting columns in the exoplanets table.

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1. The position of, and distance to, the host star. My teammate in the space apps challenge used the right ascension, declination and distance to find the relative positions of the stars, but I'm intrigued by the [Galactic](#) coordinate system (st\_glon and st\_glat).

- st\_dist
- ra
- dec
- st\_glon
- st\_glat

2. The planet's distance from its host star. We'll use the semi-major axis.

- pl\_orbsmax
- pl\_orbsmaxerr1
- pl\_orbsmaxerr2

3. The mass of the planet compared to ours.

- pl\_masse

4. The size of the planet compared to ours.

- pl\_rade

5. The composition of the planet. I know that there are some exoplanets for which this is known, but I don't think this can be determined with the provided data.

- ?

6. Habitable zone. I think the stars temperature is determined by the spectral characteristics, so st\_ssp (spectral type) is probably the source of the data. However, the table specifically has st\_teff, the effective temperature. Is it derived from the spectral type, though?

- st\_ssp
- st\_ssperr
- st\_teff
- st\_tefferr
- pl\_orbsmax (where the planet is)
- pl\_orbsmaxerr1
- pl\_orbsmaxerr2

## Interesting columns in the Kepler candidates table.

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1. The position of, and distance to, the host star. I don't see an equivalent to st\_dist from the exoplanets table. There are normd\* and classprob\* fields that, if I understand the [Mahalanobis distance](#) wiki properly might be the sort of raw data that gets digested to the simple st\_dist. Maybe the [Galactic](#) coordinates will be easier in this case.

- ra
- dec
- glon
- glat

2. The planet's distance from its host star.

- sma (planet-star distance)
- smaunc (uncertainty)

3. The mass of the planet compared to ours. I was surprised to find out that [Kepler can't determine the mass of the planet](#) at all. It's the follow up observations that provide that data, so we'll only be able to get this from confirmed exoplanets in the other table.

- ?

4. The size of the planet compared to ours.

- prad
- pradunc

5. The composition of the planet. The eqt (equilibrium temperature) of the (surface of the) planet might suggest something.

- ?

6. Habitable zone.

- sma (planet-star distance)

- smaunc
- smasrad (planet-star distance to stellar radius) The stellar radius might suggest stellar class and thereby temperature, so this may have been meant for a habitability evaluation.
- smasradun

## Exoplanets table.

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This is a table of confirmed exoplanets. This isn't limited to Kepler discoveries, but since all Kepler discoveries start with 'Kepler', it can be filtered if you (I) want. The following fields are available.

### pl\_hostname

Planet host star name.

### pl\_letter

Planet letter (b, c, d, ...).

### hd\_name

[HD](#) name

A cataloguing system.

### hip\_name

[HIP](#) name

A cataloguing system.

### ra

[RA](#) (deg)

Right ascension. I may use the right ascension and declination to calculate the star's location in relation to us. However, the Galactic Coordinates look promising, too.

### dec

[Dec](#) (deg)

Declination.

### st\_dist

Distance (parsecs)

- st\_disterr
- st\_distlim
- st\_plxblend

### st\_vj

## V (Johnson) magnitude

Classification of stars based on color.

- st\_vjerr
- st\_vjlim
- st\_vjblend

## st\_teff

### Effective Temperature (K)

This is based on the class (color) of the star, so I may not use this.

- st\_tefferr
- st\_tefflim
- st\_teffblend

## st\_rad

### Stellar Radius (solar mass)

Radius of the star as a multiple of the sun's radius.

- st\_raderr
- st\_radlim
- st\_radblend

## st\_mass

### Stellar Mass (solar radius)

Mass of the star as a multiple of the sun's mass.

- st\_masserr
- st\_masslim
- st\_massblend

## pl\_orbper

### Period (days)

- (+) pl\_orbpererr1
- pl\_orbperlim

## pl\_orbsmax

## Semi-Major Axis (AU)

In an ellipse, the distance from the center, through a focus, to the edge.

- (+) pl\_orbsmaxerr1
- (-) pl\_orbsmaxerr2
- pl\_orbsmaxlim

## pl\_orbincl

### Inclination (deg)

There's an orbital plane for reference. The planet's orbital inclination is the angle between it's orbital plane and the reference plane.

- (+) pl\_orbinclerr1
- (-) pl\_orbinclerr2
- pl\_orbincllim

## pl\_orbtper

### Time of [Periastron](#) (Julian Days)

The closest approach of the planet to its star. I'm not sure what this means in relation to days. Probably there's a day-zero point in describing an orbit. Anyway, the 'longitude of periastron' is below.

- (+) pl\_orbtperr1
- (-) pl\_orbtperr2
- pl\_orbtperlim

## pl\_orbeccen

### Eccentricity

Amount by which the orbit deviates from a perfect circle.

- (+) pl\_orbeccenerr1
- (-) pl\_orbeccenerr2
- pl\_orbeccenlim

## pl\_massj

### Planet Mass (Jupiter)

- (+) pl\_massjerr1
- (-) pl\_massjnerr2
- pl\_massjlim

## pl\_radj

### Planet Radius (Jupiter)

- (+) pl\_radjerr1

- (-) pl\_radjnerr2
- pl\_radjlim

#### pl\_method

discoveryMethod

#### st\_glon

[Galactic](#) Longitude (deg)

Probably the easiest way to plot the star's position.

#### st\_glat

[Galactic](#) Latitude (deg)

#### st\_elon

[Ecliptic](#) Longitude (deg)

Probably a more confusing way to plot the star's position since it relies on the path of the sun in the celestial sphere.

#### st\_elat

[Ecliptic](#) Latitude (deg)

#### st\_plx

[Parallax](#) (mas)

This is a method of measuring distance. Probably st\_dist is a result of this measurement.

- (+) st\_plxerr1
- (-) st\_plxerr2
- st\_plxlim
- st\_plxblend

#### st\_pmra

RA [Proper Motion](#) (mas/yr)

I think that this is used to calculate the position of the star and that the galactic coordinates are probably a result of the calculation.

- (+) st\_pmraerr1
- (-) st\_pmraerr2
- st\_pmralim
- st\_pmrablend

#### st\_pmdec

Dec [Proper Motion](#) (mas/yr)

- st\_pmdecerr
- st\_pmdeclim
- st\_pmdecblend

#### st\_pm

### Proper Motion (mas/yr)

- st\_pmerr
- st\_pmerrlim
- st\_pmerrblend

### st\_radv

#### Radial Velocity

I think this is the wobble of the star, but the value is a property of the orbiting body...) (km/sec)

- st\_radverr
- st\_radvlimn
- st\_radvblend

### st\_ssp

#### Spectral Type

The color of the star! Sweet!

- st\_ssperr
- st\_ssplim
- st\_sspblend

### st\_lum

#### Luminosity (log solar luminosity)

Maybe 'brightness' of the star... see Spectral Type.

- st\_lumerr
- st\_lumlim
- st\_lumblend

### st\_metfe

#### [Fe/H] (dex)

The metallicity of the star. I just saw on the Science Channel that any iron in a star causes the sun to go nova within minutes, so... :\*

- st\_metfeerr
- st\_metfelim
- st\_metfeblend

### st\_vsini

#### V sin (I) (km/sec)

Something to do with the rotation of the star and line-of-sight.

- st\_vsinierr

- st\_vsinilim
- st\_vsiniblend

#### **st\_acts**

Stellar Activity Index (S-Index)

- st\_actserr
- st\_actslim
- st\_actsblend

#### **st\_actr**

Stellar Activity Log (RHK)

- st\_actrerr
- st\_actrlim
- st\_actrblend

#### **st\_actlx**

Stellar Activit (Lx)

- st\_actlxerr
- st\_actlxlim
- st\_actlxblend

#### **st\_nts**

Number of Light Curves

I think the next seven fields are related to the number of measurements taken.

#### **st\_nplc**

Number non-HIP LCs

#### **st\_nglc**

Number HIP Light Curves

#### **st\_nrvc**

Number Radial Velocity Curves

#### **st\_naxa**

Number Amateur Light Curves

#### **st\_nimg**

Number of Images

#### **st\_nspect**

Number of Spectra

#### **st\_uj**

U (Johnson) magnitude

Photometric system.

- st\_ujerr
- st\_ujlim
- st\_ujblend

#### **st\_bj**



B (Johnson) magnitude

- st\_bjerr
- st\_bjlim
- st\_bjblend

**st\_rc**

R (Cousins) magnitude

Photometric system.

- st\_rcerr
- st\_rclim
- st\_rcblend

**st\_ic**

I (Cousins) magnitude

- st\_icerr
- st\_iclim
- st\_icblend

**st\_j**

J (2MASS) magnitude

Photometric system.

- st\_jerr
- st\_jlim
- st\_jblend

**st\_h**

H (2MASS) magnitude

- st\_herr
- st\_hlim
- st\_hblend

**st\_k**

K (2MASS) magnitude

- st\_kerr
- st\_klim
- st\_kblend

**st\_irac1**

IRAC 3.6 magnitude

Photometric system.

- st\_irac1err
- st\_irac1lim
- st\_irac1blend

**st\_irac2**

IRAC 4.5 magnitude

- st\_irac2err
- st\_irac2lim
- st\_irac2blend

**st\_irac3**

IRAC 5.8 magnitude

- st\_irac3err
- st\_irac3lim
- st\_irac3blend

**st\_irac4**

IRAC 8.0 magnitude

- st\_irac4err
- st\_irac4lim
- st\_irac4blend

**st\_mips1**

MIPS 24 micron flux (Jy)

Photometric system.

- st\_mips1err
- st\_mips1lim
- st\_mips1blend

**st\_mips2**

MIPS 70 micron flux (Jy)

- st\_mips2err
- st\_mips2lim
- st\_mips2blend

**st\_mips3**

MIPS 160 micron flux (Jy)

- st\_mips3err
- st\_mips3lim
- st\_mips3blend

**st\_iras1**

IRAS 12 micron flux (Jy)

Photometric system.

- st\_iras1err
- st\_iras1lim
- st\_iras1blend

**st\_iras2**

IRAS 25 micron flux (Jy)

- st\_iras2err
- st\_iras2lim
- st\_iras2blend

**st\_iras3**

IRAS 60 micron flux (Jy)

- st\_iras3err
- st\_iras3lim
- st\_iras3blend

**st\_iras4**

IRAS 100 micron flux (Jy)

- st\_iras3err
- st\_iras3lim
- st\_iras3blend

**st\_umbj**

(U-B) color (mags)

Photometric system.

- st\_umbjerr
- st\_umbjlim
- st\_umbjblend

**st\_bmvj**

(B-V) color (mags)

- st\_bmvjerr
- st\_bmvjlim
- st\_bmvjblend

**st\_vjmic**

(V-Ic) color (mags)

- st\_vjmicerr
- st\_vjmiclim
- st\_vjmicblend

**st\_vjmrc**

(V-Rc) color (mags)

- st\_vjmr cerr
- st\_vjmr clim
- st\_vjmrcblend

#### **st\_jmh2**

(J-H) color (mags)

- st\_jmh2err
- st\_jmh2lim
- st\_jmh2blend

#### **st\_hmk2**

(H-K) color (mags)

- st\_hmk2err
- st\_hmk2lim
- st\_hmk2blend

#### **st\_jmk2**

(J-K) color (mags)

- st\_jmk2err
- st\_jmk2lim
- st\_jmk2blend

#### **st\_bmy**

Stromgren (b-y) (mags)

Photometric system.

- st\_bmyerr
- st\_bmylim
- st\_bmyblend

#### **st\_m1**

Stromgren m1 (mags)

- st\_m1err
- st\_m1lim
- st\_m1blend

#### **st\_c1**

Stromgren c1 (mags)

- st\_c1err
- st\_c1lim
- st\_c1blend

#### **pl\_orbiper**

Longitude of [Periastron](#) (deg)

The closest approach of the planet to its star. There's a `pl_orbtper` which is the time of Periastron. This is the location.

- (+) `pl_orblpererr1`
- (-) `pl_orblpererr2`
- `pl_orblperlim`

#### **pl\_masse**

Planet Mass (Earth)

Number of Earth masses in this planet. Come on, 1!

- (+) `pl_masseerr1`
- (-) `pl_masseerr2`
- `pl_masselim`

#### **pl\_rade**

Planet Radius (Earth)

Number of Earth radiuses in this planet. Does this matter if the mass is near-Earth? I'm thinking of tiny planets like Le Petit Prince. Or a big fluffy pillow planet...

- (+) `pl_radeerr1`
- (-) `pl_radeerr2`
- `pl_radelim`

#### **pl\_rads**

Planet Radius (solar)

Probably the number of sun-radiuses in the planets, but...that doesn't seem to be useful since the sun is quite large. Maybe there are planets that big? I think I have all I need with the other fields, so I'll ignore this.

- (+) `pl_radserr1`
- (-) `pl_radserr2`
- `pl_radserrlim`

#### **pl\_tran**

Transit Flag (1=yes, 0=no)

There has to be a transit to measure it in the first place. I don't know what this means.

#### **pl\_trandep**

Transit Depth (percentage)

- (+) pl\_trandeperr1
- (-) pl\_trandeperr2
- pl\_trandeplim

**pl\_trandur**

Transit Duration (days)

- (+) pl\_trandurerr1
- (-) pl\_trandurerr2
- pl\_trandurlim

**pl\_tranmid**

Transit Mid-point (Julian days)

- (+) pl\_tranmiderr1
- (-) pl\_tranmiderr2
- pl\_tranmidlim

**pl\_disc**

Discovery Year

**pl\_status**

Planet Status

In this table, they're all 3. I think 3 is 'confirmed'.

**pl\_pelink**

Planet Encyclopedia

Link to more data.

**pl\_edelink**

Exoplanet Data Explorer

Link to more data.

## Kepler candidates table.

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**kepid**

Unique Kepler Identifier

**ra**

[RA](#) (deg)

Right ascension, used for finding the star in the celestial sphere.

**dec**

[Dec](#) (deg)

Declination, used for finding the star in the celestial sphere.

**kepmag**

Kepler-band Magnitude

The only search results I found were people providing the same data. I guess it's just a measurement of the brightness of the star. The following site gave it's range as 2.982 to 25.0.

<http://archive.stsci.edu/kepler/kic10/help/columns.html>

**teff**

Effective Temperature (K)

It's based on the class of the star.

**logg**

Surface Gravity (cm/s?)

The exoplanets table doesn't have this information for the Kepler planets. Maybe it's implicit in the mass/radius calculations.

**radius**

Stellar Radius (solar radius)

Radius of the host star as a multiple of the sun's radius.

**mass**

Stellar Mass (solar mass)

Mass of the host star as a multiple of the sun's mass.

**stflag**

Flag for origin of stellar parameters:

0: Teff, log(g), and Rad are derived using KIC J-K color and linear interpolation of luminosity class V stellar properties of Schmidt-Kaler (1982).

1: KIC Teff and log(g) are used as initial values for MCMC parameter search of Yonsei-Yale stellar evolution models yielding Teff, log(g), and Rad.

2: Teff, log(g), and Rad are derived using SPC spectral synthesis and interpolation of the Yale-Yonsei evolutionary tracks.

3: Teff, log(g), and Rad are derived using SME spectral synthesis and interpolation of the Yale-Yonsei evolutionary tracks.

**cdpp6**

Combined 6 hour differential photometric precision (rms of quarters 1 through 6 in units of parts per million)

**kepoi\_name**

Kepler object of interest name for display (KNNNNN.DD)

Catalog.

**kepler\_name**

Kepler name for confirmed planets (e.g. Kepler-6b)

**kepoi\_type**

KepOI Type (CANDIDATE, CANDIDATE-FOP (a candidate being studied by the Kepler Mission Follow-up Observing Program), CONFIRMED, FALSE POSITIVE)

This is a planet status.

**period**

Period

**periodunc**

Period uncertainty (days) in BKJD=BJD-2454833

**epoch**

Transit epoch (days)

The values are more than 100 and less than 400. I think this is number of days it took for the planet to pass in front of the star, but 300+ days seems like a lot.

Perhaps the epoch is the days from a reference point, like the start of the mission.

**epochunc**

Transit epoch uncertainty (days)

**depth**

Transit depth (ppm)

NASA's Kepler mission site gives this as "the fractional change in brightness". "Depth" probably refers to the dip in the light curve.

**depthunc**

Transit depth uncertainty (ppm)

**duration**

Transit duration

**durationunc**

Transit duration uncertainty (hours)

**impact**

Impact parameter

My searches only return things about the social and scientific impact of the mission, not a description of what this measurement means.

**impactunc**

Impact parameter uncertainty

**occdp**

Occultation depth (Relative flux level at phase=0.5 divided by noise)

Probably related to transit depth. I don't think I need this field.

**occdpunc**

Occultation depth uncertainty

**sma**

Planet-star distance (AU); note that is the semi-major axis when eccentricity = 0



**smaunc**

Planet-star distance uncertainty (AU)

**smasrad**

Planet-star distance to Stellar Radius Ratio

This can probably be used to evaluate the habitable zone.

**smasradunc**

Planet-star distance to Stellar Radius Ratio uncertainty

**pradsrad**

Planet to Stellar Radius Ratio

This can probably be used to evaluate the habitable zone.

**pradsradunc**

Planet to Stellar Radius Ratio uncertainty

**prad**

Planet Radius (Earth radius)

Radius of the planet as a multiple of Earth's radius.

**pradunc**

Planet Radius (Earth radius) uncertainty

**eqt**

Equilibrium temperature (K)

On the wiki page for Kepler-11g, the equilibrium temperature is the surface temperature of the planet in the absence of atmospheric effects. Probably this is a function of the class of the host star and the planets orbital distance.

**eqtunc**

Equilibrium temperature uncertainty (K)

**tm\_designation**

2MASS name

**glon**

[Galactic](#) Longitude (deg)

**glat**

[Galactic](#) Latitude (deg)

**gmag**

g'-band magnitude

**rmag**

r'-band magnitude

**imag**

i'-band magnitude

**zmag**

z'-band magnitude

**gredmag**

GRED-band magnitude

**d51mag**

D51-band magnitude

**jmag**

J-band magnitude

**hmag**

H-band magnitude

**kmag**

K-band magnitude

**grcolor**

(g'-r') color magnitude

**jkcolor**

(J-K) color magnitude

**gkcolor**

(g'-K) color magnitude

**feh**

[Fe/H] (dex)

Metallicity of the star.

**ebminusv**

E(B-V) reddening (mag)

**av**

Av extinction (mag)

**vsini**

$V \sin(i)$  (km/sec)

**parallax**

Parallax (arcsec)

Method of measuring distance.

**pmtotal**

Proper Motion (arcsec/year)

**pmra**

RA Proper Motion (arcsec/year)

**pmdec**

Dec Proper Motion (arcsec/year)

**rv**

Radial Velocity (km/sec)

The wobble of the star.

**galaxy**

Star/Galaxy Flag (0=star, 1=galaxy)

All the values in this table are 0. This is probably cruft from another database schema.

**blend**

Blend Flag

**variable**

Constant/Variable Flag (0=constant, 1=variable)

All 0 in this table.

**fov\_flag**

FOV Flag (0=outside, FOV, 1=non-target, 2=target)

**crowding**

Fraction of flux (target/total)

**neb**

Number of Eclipsing Binaries

**ncen**

Number of Centroid Values

**nts**

Number of Time Series

**nlc**

Number of Long Cadence

**nsc**

Number of Short Cadence

**normd1**

Normalized [Mahalonobis distance](#) to most probable class (class 1)

**normd2**

Normalized [Mahalonobis distance](#) to second most probable class (class 2)

**normd3**

Normalized [Mahalonobis distance](#) to third most probable class (class 3)

**classprob1**

Relative probability for class 1

Presumably this refers to the planet, however, the only thing I could find is the Sudarsky extrasolar planet classification which actually has five classes. Maybe the Kepler candidates are only part of the first three classes somehow.

[Sudarsky extrasolar planet classification.](#)

**classprob2**

Relative probability for class 2

**classprob3**

Relative probability for class 3

**classcode1**

Variability class 1

**classcode2**

Variability class 2

**classcode3**

Variability class 3

**spf1**

Significance parameter frequency 1 (probability)

Unproductive search for "significance astronomy" and "significance parameter frequency".

**spf2**

Significance parameter frequency 2 (probability)

**spf3**

Significance parameter frequency 3 (probability)

**freq1**

Frequency 1 (cycles per day)

**freq2**

Frequency 2 (cycles per day)

**freq3**

Frequency 3 (cycles per day)

**amp11**

Amplitude of 1st harmonic of frequency 1 (mags)

**amp12**

Amplitude of 2nd harmonic of frequency 1 (mags)

**amp13**

Amplitude of 3rd harmonic of frequency 1 (mags)

**amp14**

Amplitude of 1st harmonic of frequency 2 (mags)

**amp21**

Amplitude of 2nd harmonic of frequency 2 (mags)

**amp22**

Amplitude of 3rd harmonic of frequency 2 (mags)

**amp23**

Amplitude of 4th harmonic of frequency 2 (mags)

**amp24**

Amplitude of 1st harmonic of frequency 3 (mags)

**amp31**

Amplitude of 2nd harmonic of frequency 3 (mags)

**amp32**

Amplitude of 3rd harmonic of frequency 3 (mags)

**amp33**

Amplitude of 3rd harmonic of frequency 3 (mags)

**amp34**

Amplitude of 4th harmonic of frequency 3 (mags)

**phdiff12**

Phase of amp12, if phase if amp11=0 (radians)

**phdiff13**

Phase of amp12, if phase if amp11=0 (radians)

**phdiff14**

Phase of amp13, if phase if amp11=0 (radians)

**phdiff21**

Phase of amp21, if phase if amp11=0 (radians)

**phdiff22**

Phase of amp22, if phase if amp11=0 (radians)

**phdiff23**

Phase of amp23, if phase if amp11=0 (radians)

**phdiff24**

Phase of amp24, if phase if amp11=0 (radians)

**phdiff31**

Phase of amp31, if phase if amp11=0 (radians)

**phdiff32**

Phase of amp32, if phase if amp11=0 (radians)

**phdiff33**

Phase of amp33, if phase if amp11=0 (radians)

**phdiff34**

Phase of amp34, if phase if amp11=0 (radians)

**varred**

Total [variance](#) reduction of the light curve (after fit subtraction)

I think this is how well the plot matches that dip in the light wave that indicates a planet transit.

**koi\_flag**

KOI Flag designating single transit or large uncertainties. From Borucki et al (2011):  $dd = KOI$  was detected on the basis of a single transit with the period derived from the transit duration and stellar radius.

**snr**

Signal to noise ratio

**mes**

Multiple Event Statistic; MES is the detection statistic akin to a total SNR of the phase-folded transit but constructed using the matched filter correlation statistics over phase and period.

**chi**

Goodness of fit metric

**oeslc**

Ratio of odd to even numbered transit depths derived from light curve modeling

**oesdv**

Ratio of odd to even numbered transit depths reported by data validation pipeline

**cenra**

[Centroid RA](#) offset (arcsec); transit source position minus target star position

I think this means that Kepler's able to distinguish the distance to the planet and the distance to the star. That's one fine machine. Probably that's what all that parallax stuff is about.

**cenraunc**

[Centroid RA](#) offset uncertainty (arcsec); transit source position minus target star position

**cendec**

Centroid dec offset (arcsec); transit source position minus target star position

**cendecunc**

Centroid dec offset uncertainty (arcsec); transit source position minus target star position

**cenoffset**

Centroid total offset (arcsec); transit source position minus target star position

**cenoffsetunc**

Centroid total offset uncertainty (arcsec); transit source position minus target star position

**obs**

Observed quarters; Six integers indicating which quarters the star was observed.

```
I found something that referred to quarters as a segment of time for
observations.
```

**dra**

RA Offset of background object containing the transit

```
Is the background object the star?
```

**ddec**

Dec Offset of background object containing the transit

**offset**

Offset of background object containing the transit

**bkgdepth**

Background Object Transit Depth

**bkgkepid**

Background Object KeplID

**djmag**

Delta J-band magnitude between background object and target

**scicomm**

Science team comment

```
These are additional details about the observation like "Secondary
eclipse" and "Stellar binary", not exclamations like "w00t!" or "Space
is the place!". Wholly professional.
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