Exercise 13. Exoplanet’s Physical Parameters

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**From “Exercise 12. Exoplanet Transits” collect the following data:**

**------------------------------------** Exoplanet 1 **------------------------------------**

Catalog designation: \_\_\_\_\_\_KIC 757450\_\_\_\_

Orbital (transit) Period: \_\_\_\_\_8.888\_ [days] Fraction of light blocked: \_\_\_0.017991\_

Stellar Effective Temperature: \_\_\_\_5332\_\_\_\_ [°K] Stellar radius: \_\_\_\_0.843\_\_\_\_ []

**------------------------------------** Exoplanet 2 **------------------------------------**

Catalog designation: \_KIC 8191672\_\_\_\_\_\_\_\_

Orbital (transit) Period: \_\_\_\_17.587\_ [days] Fraction of light blocked: \_0.005497\_

Stellar Effective Temperature: \_\_\_6290\_\_\_\_ [°K] Stellar radius: \_\_\_\_\_\_1.746\_\_ []

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You will need the surface gravity of the star. To read it from the target pixel file, add the following lines to your python code (around line 29):

star\_logg = tpf.get\_header()[50] # log(g) star surface gravity

print('Stellar surface gravity, log(g) =', star\_logg)

**Use the following relations to calculate physical parameters of the planets.**

1) Star’s mass: ; ( and in solar units)

where surface gravity of the Sun:

2) Star’s luminosity: ( in solar radius)

3) Planet radius:

4) Planet’s orbit radius:

Or, when in years, in astronomical units, and in solar masses:

**------------------------------------** Exoplanet 1 **------------------------------------**

Catalog designation: \_\_\_\_\_\_\_ KIC 757450\_\_\_

Star’s mass: \_\_\_0.918\_\_\_ [solar masses]

Star’s luminosity: \_\_\_\_0.5153\_\_ [solar luminosities]

Planet radius: \_\_\_\_\_78,684\_\_\_ [km]

Planet’s orbit radius: \_\_\_79.997\_\_ [km]

**------------------------------------** Exoplanet 2 **------------------------------------**

Catalog designation: \_\_\_\_\_ KIC 8191672\_\_\_\_

Star’s mass: \_\_\_1.128\_\_\_ [solar masses]

Star’s luminosity: \_\_\_4.281\_\_\_ [solar luminosities]

Planet radius: \_\_\_\_90,059\_\_\_\_\_ [km]

Planet’s orbit radius: \_\_\_309.3\_\_ [km]