



to enable anyone, anywhere, to participate in scientific discovery through variable star astronomy

American Association of Variable Star Observers  
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### 3bd's Featured Variable: R Leonis in Leo the Lion

I bet you have seen a star twinkling —the air surrounding Earth makes it look like the star is sparkling! Even if we went to outer space, we could see many stars change brightness.

"Variable stars" continuously dim, brighten, and dim. Some complete the pattern in under a second, while others take years.

A`WhSdST WefSdKAG US` eWVZ[e\_ a` fZ [eD  
 >Vd` [e] fZWUa` eVVSf[a` >Vd` fZW>[a` ž;f  
 i` Sea` k` fZWAgdFZ` a` Y` bVd` aV` hSdST` W  
 V[eUahVWZ? S] VkgdV[eUahVd` aXFZ[eefSd  
 Tk` aa][ Y` VVdV/STagf a` W[ aUg` Sd  
 XWVfi` Vd` aXFZW` dYZf` eSdDW` g`ge/3` bZS  
 >Vd` [efi` fZWV` Sd` aXFZ[eUa` eVVSf[a` žD  
 >Vd` [eSbbV` Sd` eUSdV` S` V` ad` eSe` S<sup>^</sup>  
 fd[S` Y` M` [fZ` fi` a` kV` ai` efSdž

D>Vd` [e[eSdV` Y[S` f` eSd` V` Sd` fZWV` V` aX[fe  
 ↑XV;fe` ai` ego` SUMY` dSh[fk` \_` V` S` e[feagfVd  
 Sf`\_` aebZVdV` e` aa` eV` k` Tag` V` i` ad` \_` [ Y` SeZV<sup>^</sup>  
 Sd` ag` V` [feUadV` Bg` eSf[a` ei` [fZ[` fZWUadV  
 \_` Sk` eV` V` eZ` aU]` i` ShV` e` fZ` dg` YZ` fZ[e` eZV<sup>^</sup>  
 USge[` Y` hSdSf[a` \_` [ TdYZf` V` e/` Z[UZ  
 LZS` YV` e` ahVd` STagf` %`#` V` Skef` fZ[e` \_` Sk  
 ZSbbW` fa` agdEg` \_` [ ` T[<sup>^</sup>fa` kV` Sdž

I` ZW` V[` fD>Vd` [e[eV[X]Ug` f` fa` eWVWV [   
 T[ aUg` Sd` ea` aa]` adfZW` \_` [ee]` Y` SefSdaX  
 fZWfkb[US` e` fSdbSffVd` ž` fZWefSd[eef[<sup>^</sup> fZWV  
 i` WgefUS` if` eWVf`

Time	Magnitude
_____	_____
_____	_____
_____	_____

### Star Finder Chart for R Leonis

It is easy to estimate the brightness ("magnitude") of a star, but first note:

- in finder charts like below, brighter stars are indicated by larger dots
- the *brighter* the star, the *lower* the magnitude number
- magnitudes are written to the nearest tenth—but *without* a decimal point, which could be confused as a star. So, 16= magnitude 1.6
- in this chart, magnitudes for comparison stars—nearby stars to compare a given star's brightness to—are noted

Find two comparison stars close to your given variable star's brightness—one brighter and one dimmer. Then observe—is the variable's brightness half-way between the two comparisons'? A quarter? Really close? Apply that fraction to the difference in the two magnitudes and you estimated the star's brightness for that time!

This star comparison and finder chart for Propus will help you estimate its brightness.

## About the AAVSO

The American Association of Variable Star Observers (AAVSO) is an international nonprofit organization of citizen and professional astronomers interested in stars that change in brightness—variable stars.

From its earliest days in 1911, AAVSO members have included some of the most prolific astronomers of the 20th & 21st centuries.

### AAVSO Databases

**AAVSO International Database (AID):** The largest and most comprehensive digital variable star database in the world, with over 43 million variable star observations—a free resource for the entire scientific community

**Variable Star Index (VSX):** a collection of up-to-the-minute data on over 200,000,000 specific variable stars

**Spectroscopy Database:** spectroscopic observations of stars

**Solar Database:** Sudden Ionospheric Disturbance (SID) Database, and data relating to sunspot observations

**Exoplanet Database:** long-term follow-up information on planets orbiting other stars

Community



Explore



Education



## Connect with the AAVSO

### Who are AAVSO Members?

- ★ A **citizen scientist**—contributes to science by acquiring data on variable objects and submitting them to our databases, or other activities, such as data mining.
- ★ An **educator or mentor**—teaches observing skills to fellow AAVSO observers, through instructing AAVSO CHOICE courses or being a mentor.
- ★ A **student**—is learning how to find a star, set up a telescope, observe, submit data, or is increasing their astronomy knowledge
- ★ A **professional astronomer**— uses AAVSO data and services to advance their research
- ★ An **AAVSO Ambassador**—a student or young professional representing AAVSO through astronomy education and activities

### Interested in becoming an ambassador?

- [www.aavso.org/ambassador-program](http://www.aavso.org/ambassador-program)
- Email [Lward@aavso.org](mailto:Lward@aavso.org)

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**You, your friends, and colleagues are also invited to join us for:**

### AAVSO's free-to-all 2021 Webinar Series!

Come to one or all! Most Saturdays of the year.

See the schedule and sign up:

<https://www.aavso.org/2021-webinars>



AAVSO can help YOU become a citizen astronomer!

**Discover the benefits of membership and join us!**

<https://www.aavso.org/join-aavso#benefits>

Benefits include being able to participate in our **mentor program**: beginners are paired with an experienced observer for guidance and techniques:

<https://www.aavso.org/mentor-program>

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### AAVSO Tools for Beginner Observers:

**Beginner Tutorials:** aimed at those with absolutely no experience, these introduce variable star science basics and then provide "challenges" for you to apply the concepts:

<https://www.aavso.org/tutorials>

**AAVSO Online Forum:** talk to peers for advice: <https://www.aavso.org/forum>

**Observing Manuals:** each one is dedicated to a type of observing, including visual, CCD, DSLR, Spectroscopy, Solar, and more:

<https://www.aavso.org/observing-manuals>

**CHOICE Courses:** peer-taught informal online observing courses:

<https://www.aavso.org/choice-astronomy>

Let's connect and explore

