

# **Using Period-Luminosity to Calculate Distance for the RR Lyrae Star EZ Lyr**

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Reliable methods to measure intergalactic distances are a valuable resource in the field of astronomy. Periodic variable stars, such as RR Lyraes, can be used as standard candles to determine the distance to the stellar structures where they are located. For this reason, many different student groups observed and analyzed RR Lyrae stars through a research course offered by Our Solar Siblings, and the focus of this particular study was the star EZ Lyr. Images of EZ Lyr were taken by Las Cumbres Observatory and processed using tools provided for the research course. Light curves were produced in each filter that were analyzed to determine the star's period and luminosity. The period-luminosity relations described in Caceres and Catelan 2008 were used to calculate the distance to EZ Lyr in each filter. The final distance measurements were consistent with the established results from the GAIA satellite.

# **Calculating Galactic Distances of RR Lyrae Variable Star RS Boo Using the Period-Luminosity Relationship**

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Through the use of the distinct period-luminosity relationship that RR Lyrae stars possess, we calculated the galactic distance of RS Boo, a northern hemisphere RR Lyrae variable star, despite the many difficulties in calculating distances in space. Over two weeks, we employed Las Cumbres Observatory's (LCO) 0.4-meter SBIV northern hemisphere telescopes to capture cadence photographs in B, V, i, and z bands of light. Using *autovar* and *astroquery* we determined the luminosity of standard candles in our photographs by calibrating them with known values. A period of  $0.3776 \pm 0.0027$  days and period-luminosity graph was then produced for RS Boo and using this information, we could calculate a distance in each band of light with an average of  $778 \pm 22$  parsecs. These distances were then compared to GAIA's parallax distance calculation with an overlap of 5 parsecs.