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## AD CMI - Study of Stellar variability and their comparisons with Sun like stars.

Astronomers have uncovered a captivating facet among the myriad celestial bodies, known as Variable Stars. These mysterious entities undergo changes in their radiance over time, offering astronomers a unique opportunity to study the complexities of stars. Since 1911, the **American Association of Variable Star Observers (AAVSO)** has been diligently monitoring these stars. Variable star astronomy is a vital field of study as it provides valuable information about stellar properties and their evolution. In the course of this project, the main focus is centred on the study of **AD CMI**, a **Cepheid variable** star. Cepheids are a type of variable star that pulsates radially, varying in both diameter and temperature.

This study aims to provide an overview of stars, with a particular emphasis on variable stars, using AD CMI as an illustrative subject. The brightness of AD CMI varies within a magnitude range of 9.596 to 9.284 over its variable period. Within a three-hour period, it is observed that the magnitude of AD CMI decreases, remains constant for a few minutes, and then increases once again.

The process of the complete project included several night sky observations and post-processing of these images. It also involved performing photometric methods and data analysis at the end of it. Furthermore, this study results in the creation of a light curve representing the variability of AD CMI. This curve is generated by plotting brightness against time using the Python programming language. After performing a sine curve fitting, this plot facilitates the extraction of crucial attributes such as amplitude, frequency, and phase of AD CMI's variable behaviour.

These discoveries offer valuable insights into the complex nature of Stars and Sun like stars. The finding into the project can be further used to study Stellar variability of other stars and compare it with the Sun. Not only this but also can be used as initial level studies to differentiate between regular stars and Sun like stars. In summary, the continuation of this study with more complex celestial objects may open new doors to gain a more detailed understanding of the Sun and the Stellar variability.

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### Theme

Solar - Stellar Connections

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