

2002 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Earth & Space Sciences

PROJECT TITLE : Eclipsing Binary Stars: Statistical Analysis
of Classification vs. Celestial Positioning

AWARD : Second Award

SCHOOL : Union County High School

FINALISTS : Timothy Curtis Allen

COUNTRY : U.S.A.

Eclipsing Binary Stars: Statistical Analysis of Classification vs. Celestial Positioning
(A Seven-Year Study)

Allen, Timothy C.

Earth and Space Sciences

This research introduces a new, more efficient method of age determination for eclipsing binaries through use of celestial positioning. Statistical analyses of x-y plots of eclipsing binary stars within our, Milky Way Galaxy were conducted in order to find the standard deviation of each eclipsing binary star's distance from the celestial equator. Before the standard deviations could be considered for comparison, the medians from each of the three x-y plots were examined. These medians had to show a value close to zero in order for the standard deviations to be relevant. A value close to zero indicates a proportional and symmetrical plot with an equal distribution of stars on each side of the plot. All three plots generated indicated a median no greater than 1/100 in distance from the celestial equator. A low standard deviation indicates young relative age. The statistical analysis calculated standard deviations of 2.41 for W Ursae Majoris, 1.77 for Algol, and 1.20 for Beta Lyrae. The statistical analyses were then compared to the previously made visual and mathematical analyses conducted in previous years' studies. All analyses conducted conclude that W Ursae Majoris is the oldest type and Beta Lyrae is the youngest type of eclipsing binary star. This method can be implemented to greatly reduce time in studying the relative ages of individual objects and types of objects within our Milky Way Galaxy.

評 語

- (1) 作者針對此問題，經過七年的努力，非常值得肯定。
- (2) 作者分析資料及成果展現能力亦已成熟，對研究方法的掌握，亦值得肯定。