# Assessing the Photometry of GSC 03144-00595: A Radially Pulsating, Delta Scuti, Triple Mode Variable Star

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The majority of stars in the universe fluctuate in brightness. Most of these stars oscillate at one frequency and are known as single mode variable stars. However, less common variable stars exist that fluctuate at three distinct frequencies; these stars are called triple mode variable stars. Little is known about triple mode variable stars because only four have been discovered. Building upon what we learned from last year's work, we have now discovered the fifth triple mode variable star. In 2013, GSC 03144-00595 was studied and the researchers discovered that it was a multimode pulsating star, but were unsure if a third mode was present because the mode had such a small amplitude. We collected approximately 800 data points, and using Period 04 to conduct Fourier analysis, we found that GSC 03144-00595 is a triple mode variable star. After this discovery, the light curve and modes gathered from the star were used in collaboration with data from other triple mode variable stars to better understand this understudied class of star. Through analysis, it was determined that the period ratio of triple modes is significantly greater than the double mode period ratio, so a new period ratio was calculated. The new period ratio will allow for the systematic discovery of triple mode stars, with only the analysis of two modes, vastly increasing the rate of discovery, since the discovery of f3 requires more data than is needed to find the first two modes. These star's stellar parameters give accurate information about the distance, temperature, luminosity and size of the star, as well as nearby celestial bodies, which has greatly increased our knowledge of the universe and will continue to do so as long as they continue to be discovered.

**Awards Won:**

Fourth Award of $500