Spectral Measurements of Near-Earth Asteroids

Barber, Kelsey

Spectral analysis can be used to identify the class of near-Earth asteroids (NEAs) to determine their relative density. The hypothesis stated NEAs are both S-Type asteroids (denser asteroids from the main asteroid belt's interior) and C-Type asteroids (less dense asteroids from the main asteroid belt's exterior) because there are multiple ways of altering an asteroid's orbit. Targets were analyzed for their Relative Spectral Albedo (percentage of light reflected in G, R, I, Z, and Y filters). Graphing the Relative Spectral Albedo versus the filter's wavelength determines the class of asteroid. Three asteroids were observed for this project: 1998 XB, Eros, and Ganymed. An unexpected side-effect of the research occurred due to a breakdown of the telescope. Typically, research would be restarted because the researcher would be concerned that the analysis would appear different. In this case, the research was continued on a different telescope of the same size and was seen to correlate with the results of the original telescope, thus showing restarting research may be over burdensome. The data showed all the targets were S-Type asteroids. This suggests there is a higher percentage of S-Type NEAs than the percentage of S-Type asteroids in the whole solar system. This research is important because a denser asteroid will hit Earth with more energy and would be harder to deflect. This research can also be applied to asteroid mining. By providing information on the composition of a particular asteroid, it can be determined if the content of an asteroid is worth mining.

Awards Won:
University of Arizona: Tuition Scholarship Award