Rocks of the Rainbow: Asteroid Classification Using SDSS Filters

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Asteroid taxonomy is the classification of asteroids on the basis of the shape of their emission spectrum and their color. These properties are believed to correspond with the surface composition of the object. Currently, the two main types of spectral classification are the Tholen classification, which consists of 14 categories, and the SMASS classification, which includes 24 types. For this project, we will be taking images of asteroids known to be a part of each of the Tholen classification categories using Faulkes telescope. We will use 5 different types of filters (called SDSS filters) in order to sample a large part of the visible spectrum of the asteroid, and decide which combination of filters is the best to accurately classify the objects. Using simple flux ratios, we hope to be able to create a “classification algorithm” which users of Faulkes telescope (and other telescopes around the world with SDSS filters) can apply to figure out what type of asteroid they are observing. Four unclassified and one newly discovered NEA's were successfully classified using our method. In addition, meteorite spectra was taken from a sample of an ordinary chondrite with a known and classified parent body to identify relations between the silicates present in these chondrites to the spectral absorptions seen in S and Q type asteroids.

Awards Won:
Fourth Award of $500