**My Abstract**

The asteroid (16) Psyche is the largest asteroid classified as an M-type in the Tholen asteroid taxonomy. M-type asteroids are characterized by their uniquely featureless infrared spectra, which may be indicative of these objects being the stripped cores of early, differentiated planetesimals. If true, this would mean M-type asteroids offer a rare opportunity to study the exposed cores of terrestrial planets. However, observations of Psyche have returned conflicting results on the question of its origin, as some studies have found the presence of water-rich minerals that are indicative of different formation mechanisms. Therefore, we propose to obtain UV spectra of Psyche, including the first spectra down to 170 nm, using the Space Telescope Imaging Spectrograph (STIS) on the HST. These spectra will be used to search for specific UV features, such as Fe-O transfer bands and spectral blueing, that could provide robust evidence for the emplacement of minerals such as pyroxenes and olivines on the surface. This analysis will allow us to determine the composition and history of Psyche, providing critical context for the upcoming NASA Discovery mission Psyche. Furthermore, as only a handful of asteroids have been observed in the UV, these observations will provide new insights into asteroid taxonomy, as well as improve our understanding of planet formation and mineral distribution in the early solar system.

**Paper Abstract**

The Main Belt Asteroid (16) Psyche is the target object of the NASA Discovery Mission Psyche. We observed the asteroid at ultraviolet (UV) wavelengths (170–310 nm) using the Space Telescope Imaging Spectrograph on the Hubble Space Telescope during two separate observations. We report that the spectrum is very red in the UV, with a blue upturn shortward of ~200 nm. We find an absorption feature at 250 nm and a weaker absorption feature at 275 nm that may be attributed to a metal-oxide charge transfer band. We find that the red-sloped, relatively featureless spectrum of (16) Psyche is best matched with the reflectance spectrum of pure iron; however, our intimate mixture models show that small grains of iron may dominate the reflectance spectrum even if iron only comprises up to 10% of the material on the surface. We also stress that there is a limited database of reflectances for planetary surface analogs at UV wavelengths for comparison with the spectrum of (16) Psyche. The mid- and far-UV spectra (<240 nm) are markedly different for each of the four asteroids observed at these wavelengths so far, including ones in the same spectral class, indicating that UV observations of asteroids could be used to better understand differences in the composition and processing of the surfaces of these small bodies.

**Paper Link**

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