Karsten Hintz

**Award:** Undergraduate Student Research; $3188.00

**Status:** Senior, Physics

**Advisor:** Sebastian Zamfir

**Research Topic:** Evaluating Information Content in SDSS Quasar Spectra as a Function of Signal-to-Noise

**Abstract:** (First Paragraph of Proposal)In the last 20 years, a new type of framework has evolved in observational astronomy; large amounts of data are being gathered by survey-type projects such as the Sloan Digital Sky Survey (SDSS). Data collection for this program began in 2000 and by 2010 SDSS has obtained over 100,000 spectra of quasars at low and high redshift. This data is typically made available in public archives, which essentially become “goldmines” for a wide range of projects suitable for students, researchers, amateur astronomers and even citizen science projects. However, it is known that of this tremendous number of spectra, only about 10-20% have a suitable signal-to- noise ratio (S/N) for measurements such as width and internal shifts of broad emission lines. The goal of my proposed project is to test the hypothesis that these measurements are sensitive to changes in S/N. I will start by measuring the width and shifts of lines in very high quality quasar spectra. I would subsequently (artificially) degrade the S/N of the original spectra, using themknoisetask in IRAF, in several distinct steps and re-measure the same parameters. The goal of this process is to look for systematic trends induced by the S/N degradation. I will evaluate its consequences in obtaining parameters of high interest in cosmology, e.g., the mass of the black hole (BH), which is very sensitive to the width of the broad emission lines.

**Biography:** Karsten Hintz is a senior at the University of Wisconsin Stevens Point and is double majoring in physics and math, and has a minor in anthropology. He works as a trigonometry, calculus and chemistry tutor in the Tutor-Learning Center at UW-Stevens Point. Karsten also spends his time lecturing to kids and adults as a planetarium lecturer at the Allen F. Blocher Planetarium, and as an observatory operator at the Arthur J. Pejsa Observatory. Karsten recalls being interested in science as a child and developed a  
 particular curiosity in the science of physics and astronomy after he was gifted a telescope at a young age. He plans to continue nurturing his interest in physics and astronomy at the undergraduate level and eventually going on to pursue a doctorate in physics or math. After completing his doctorate Karsten hopes to pursue a career in academic research.

**Congressional District:** 3

**Congressional Representative:** Ron Kind