The background of the slide is a dark space filled with numerous small, greyish-brown asteroids of various sizes. A prominent, bright, yellowish-white streak, likely representing a comet or a meteor, curves across the upper right portion of the image. The overall lighting is dim, with a slight gradient from top to bottom.

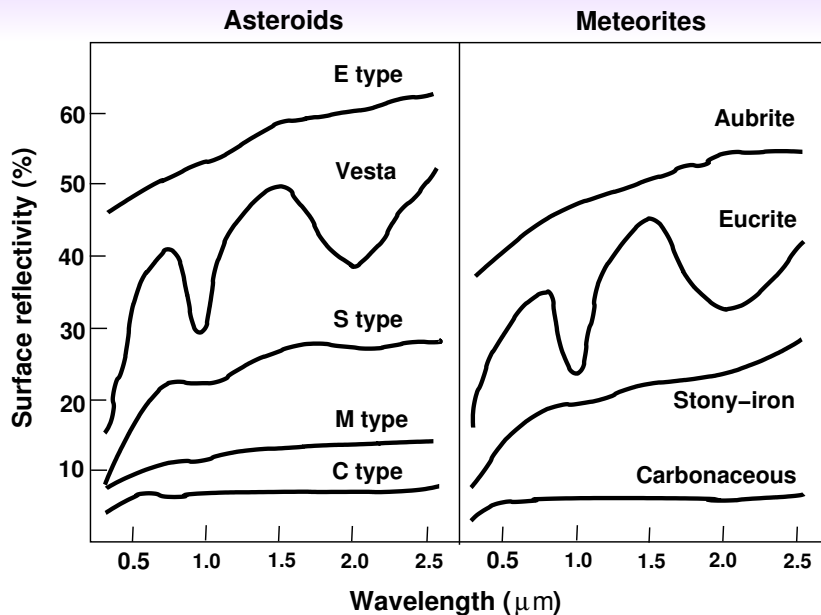
Asteroid spectroscopy with SALT

A feasibility study

Tomasz Kwiatkowski, Dagmara Oszkiewicz, Toma Tomov

CAMK, 2013-05-22

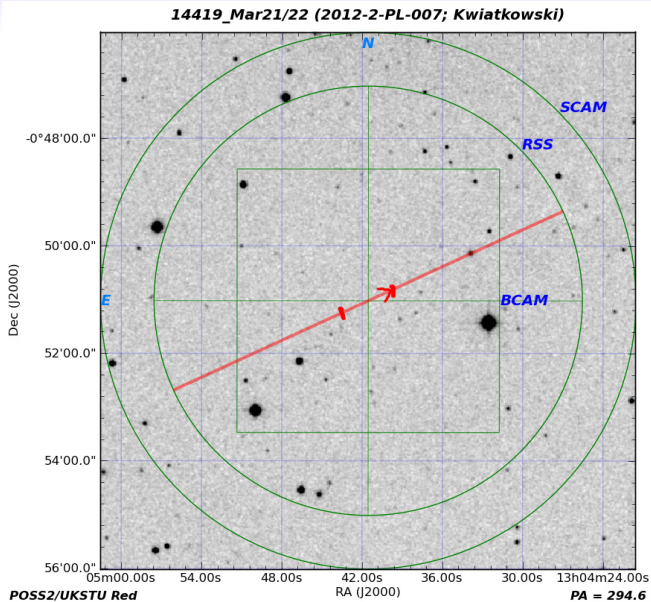
Asteroid reflective spectra



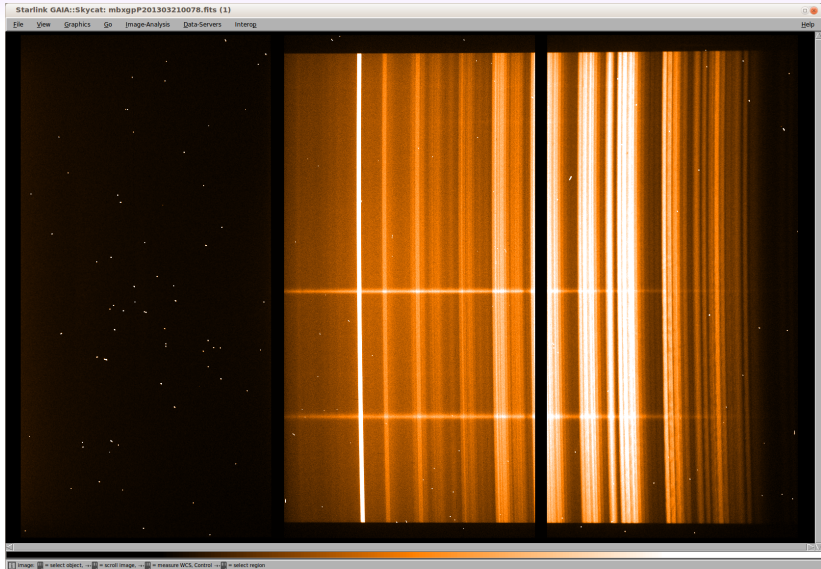
Asteroid spectroscopy with RSS

- broad absorption features \Rightarrow low-res sufficient (PG0300)
- solar analog spectrum needed
- problem: currently non-sidereal tracking is not available...
- ...but most Main Belt asteroids move $< 30''/h$
- solution: align the slit parallel to the asteroid trail, make 20 120 s exposures, combine results
- bonus: natural dithering smears fringes

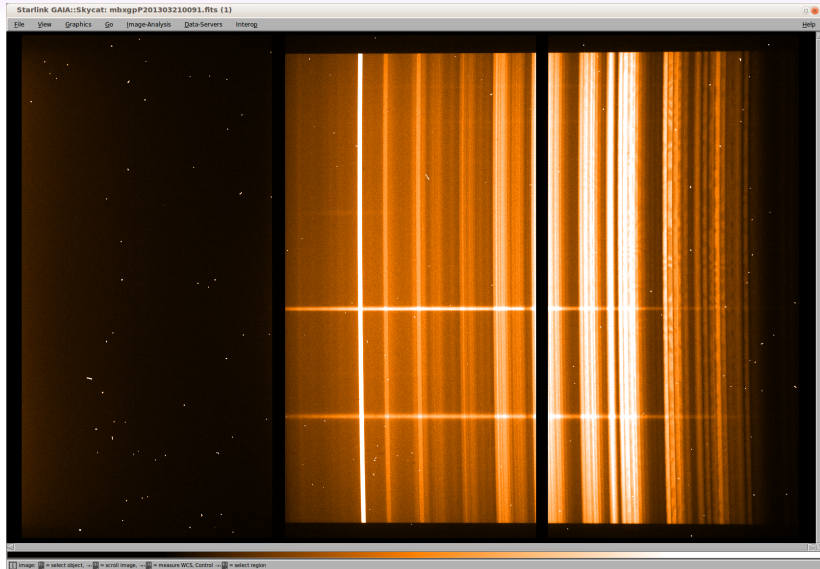
Test asteroid: 14419, SA=Amanda Gulbis



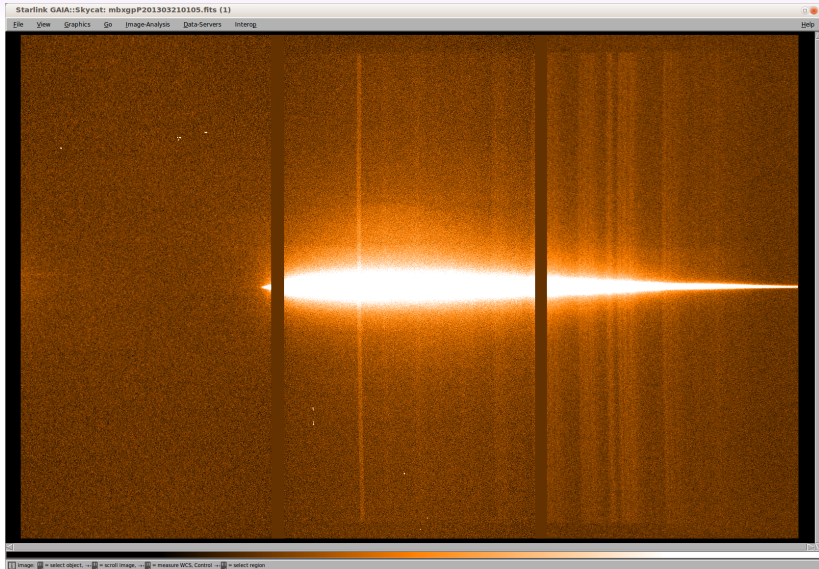
Asteroid spectrum, No 1



Asteroid spectrum, No 20



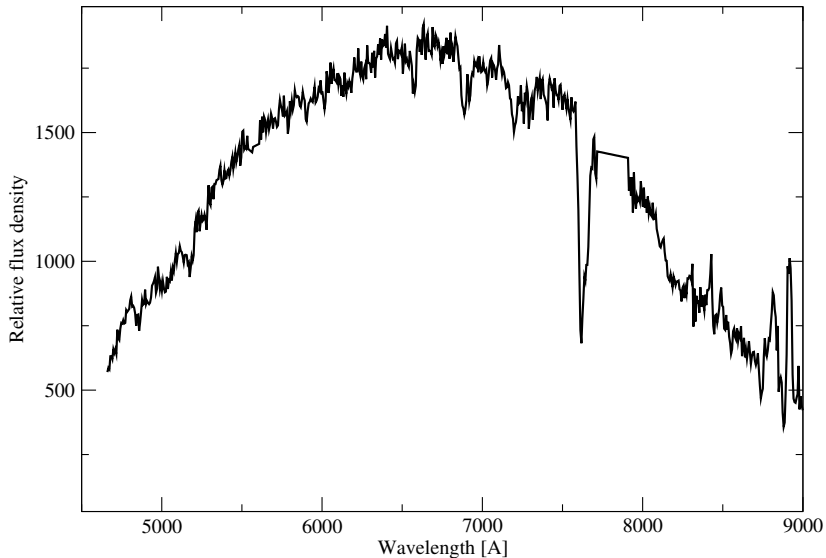
Solar analog spectrum



Wavelength calibrated asteroid spectrum

Spectrum of 14419

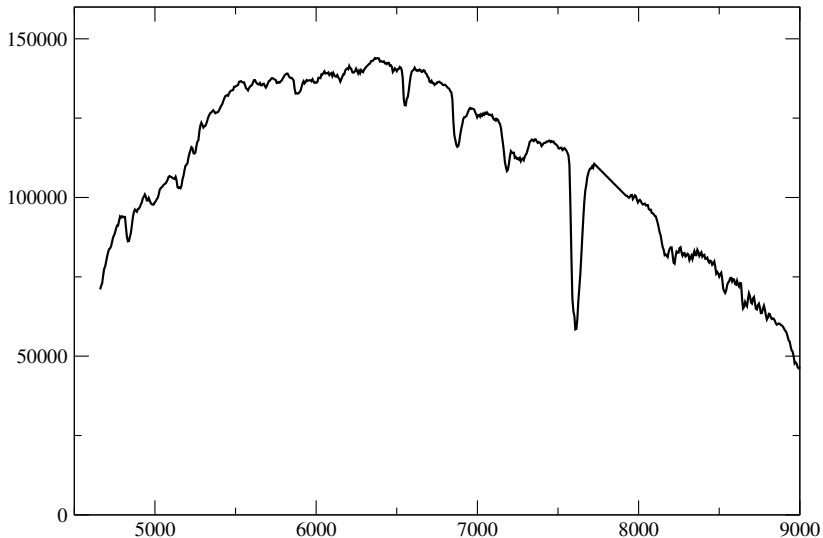
Combined 20 individual spectra, 120s each



Solar analog spectrum

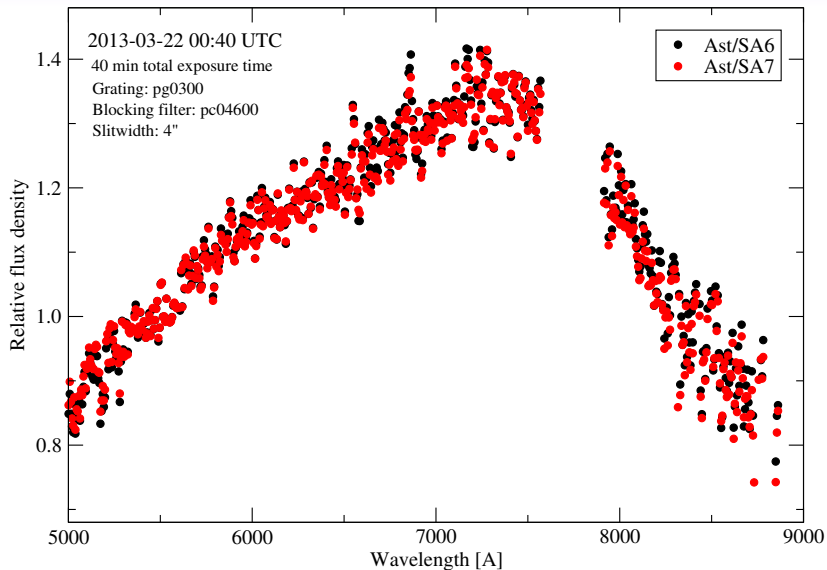
Solar analog 6 spectrum

Combined two 3 sec exposures

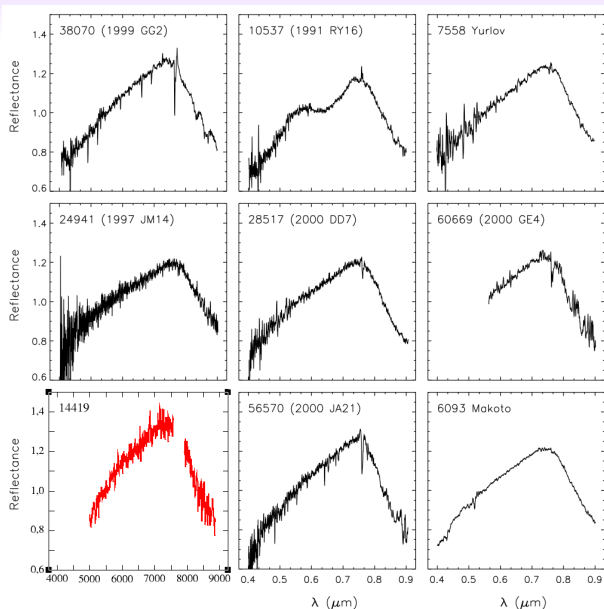


Asteroid spectrum divided by solar analog

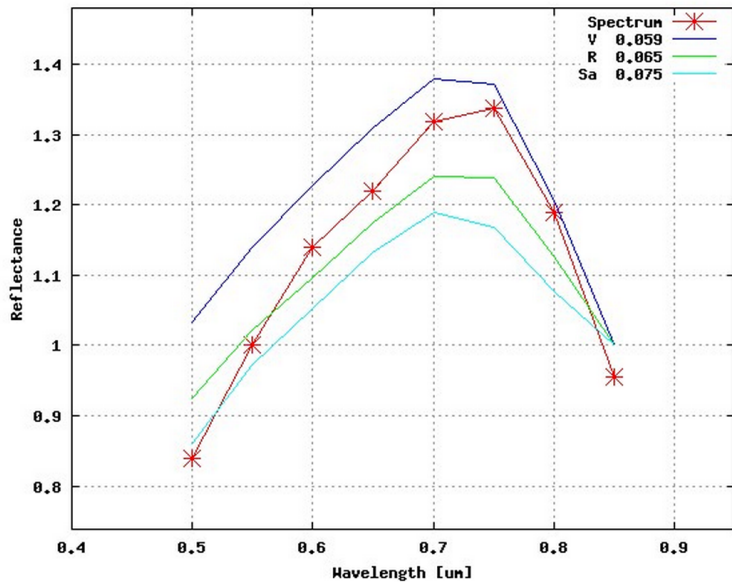
Combined 20 individual 120s spectra, divided by solar analogs, normalized at 5500Å



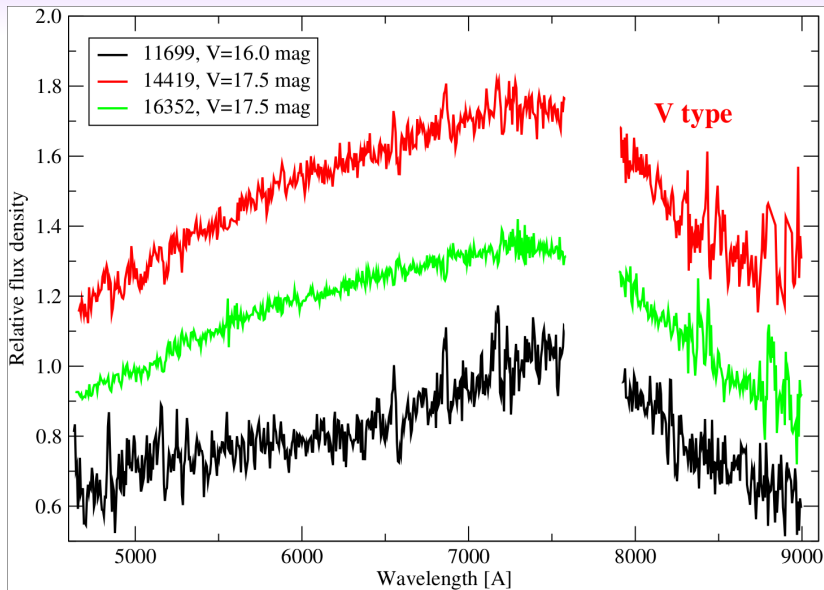
14419 spectrum compared with V-type asteroids



Bus-DeMeo taxonomy of 14419



Spectra of three asteroids



Conclusions and future plans

- Conclusions:
 - Asteroid spectroscopy with RSS gives good results
 - For fainter asteroids non-sidereal tracking would be desirable
- Future plans:
 - SALTICAM unfiltered photometry of very-small, Chelabinsk type asteroids (2013-1-POL-003)
 - RSS R=300 spectroscopy of space weathered asteroids (in the $0.32 - 0.6\mu\text{m}$)
 - HRS R=100000 spectroscopy of dirty white dwarfs: chemical composition of extra-solar asteroids