

# The Dust Scattering Halo of Cygnus X-3

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### Abstract:

Dust in the foreground of bright point sources will scatter X-rays through arcminute scale angles, producing a diffuse 'halo' image. The scattering halo intensity is strongly sensitive to the dust grain size distribution, spatial distribution, and composition. The X-ray scattering cross-section is also highly sensitive to the large end of the dust grain distribution, which is difficult to measure with other wavelengths. I will demonstrate how a Bayesian analysis of the scattering halo around Cyg X-3 yields a grain size distribution. Examination of the energy resolved halos can also be used to constrain the optical properties of astrophysical dust. As we look towards the next generation of X-ray telescopes, the combination of high resolution spectroscopy with imaging will be uniquely suited to studying the composition of dust grains. At soft energies in particular, the spectrum of scattered light is likely to have significant features at the 0.3 keV (C-K) and 0.5 (O-K) photoelectric absorption edges. This direct probe of ISM dust grain elements will be important for (i) understanding the relative abundances of graphitic grains or PAHs versus silicates, and (ii) measuring the depletion of gas phase elements into solid form.

**3:15 pm**

Refreshments  
CAS Room 500

**3:30 pm**

Seminar  
CAS Room 502

### Next Week

- *Bryce Croll*  
*Boston University*
- Multiwavelength Observations of Disintegrating Transiting Planets & Planetesimals

