

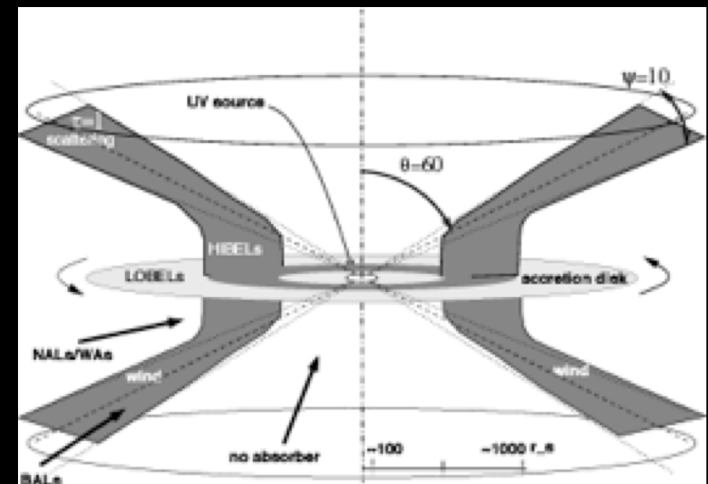
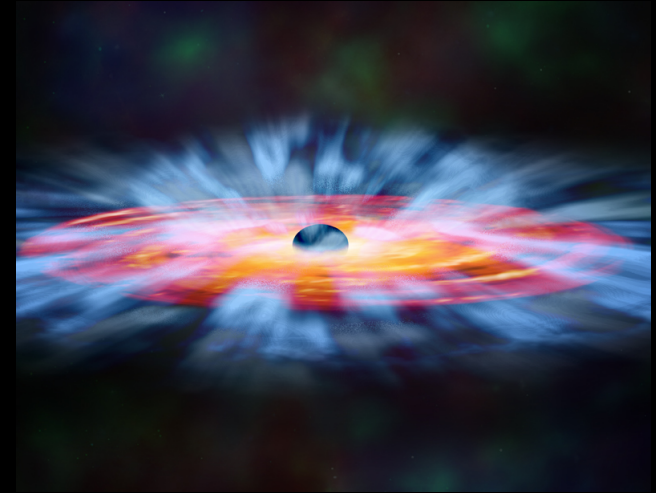
Undergraduate Research Project

Project Goals:

- Constrain the properties of relativistic winds of quasars and determine whether they regulate the evolution of their host galaxies.

Project:

- Analyze spectra taken with X-ray telescopes of distant quasars to constrain the velocities, column densities, ionization, mass outflow rates and momentum boosts of the relativistic winds.
- Perform correlation analyses of the outflow properties and bolometric luminosities to obtain insight of the acceleration mechanism of the wind.
- Perform principal component analysis of the spectra of X-ray bright Seyferts and quasars to study their outflow properties.



Empirical Wind Model

Undergraduate Research Project

Project Goal : Constrain the inner most stable orbit, the spins and inclination angles of supermassive black holes in several gravitationally lensed quasars.

Project : Data analysis of observations of gravitationally lensed quasars performed with the *Chandra X-ray Observatory*.

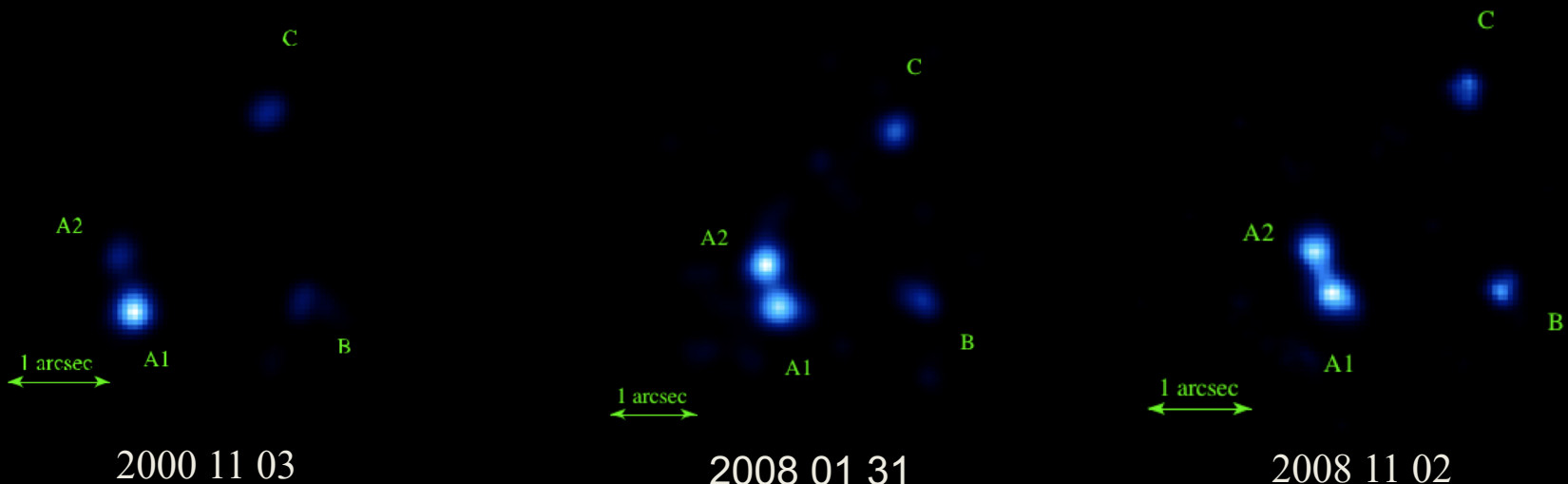
Extract the X-ray light curves of the lensed images.

Determine the flux ratios of images versus time to isolate microlensing events.

Produce distributions of the energy shifts of the Fe K lines in the X-ray spectra to constrain the ISCO and spin of the black holes.



Chandra X-ray Observatory



Undergraduate Research Project

Project Goal : Determine the sizes of X-ray emission regions around a supermassive black hole

Project : Data analysis of observations of gravitationally lensed quasars performed with the *Chandra X-ray Observatory*.

Extract the lensed X-ray images for several selected energy bands.

Determine the centroids of the lensed images in each energy band.

Using the gravitational lensing code *glafic* determine the source position/distribution that produces the image positions in each energy band. This will provide constraints on the sizes of different X-ray emission regions.



Chandra X-ray Observatory

