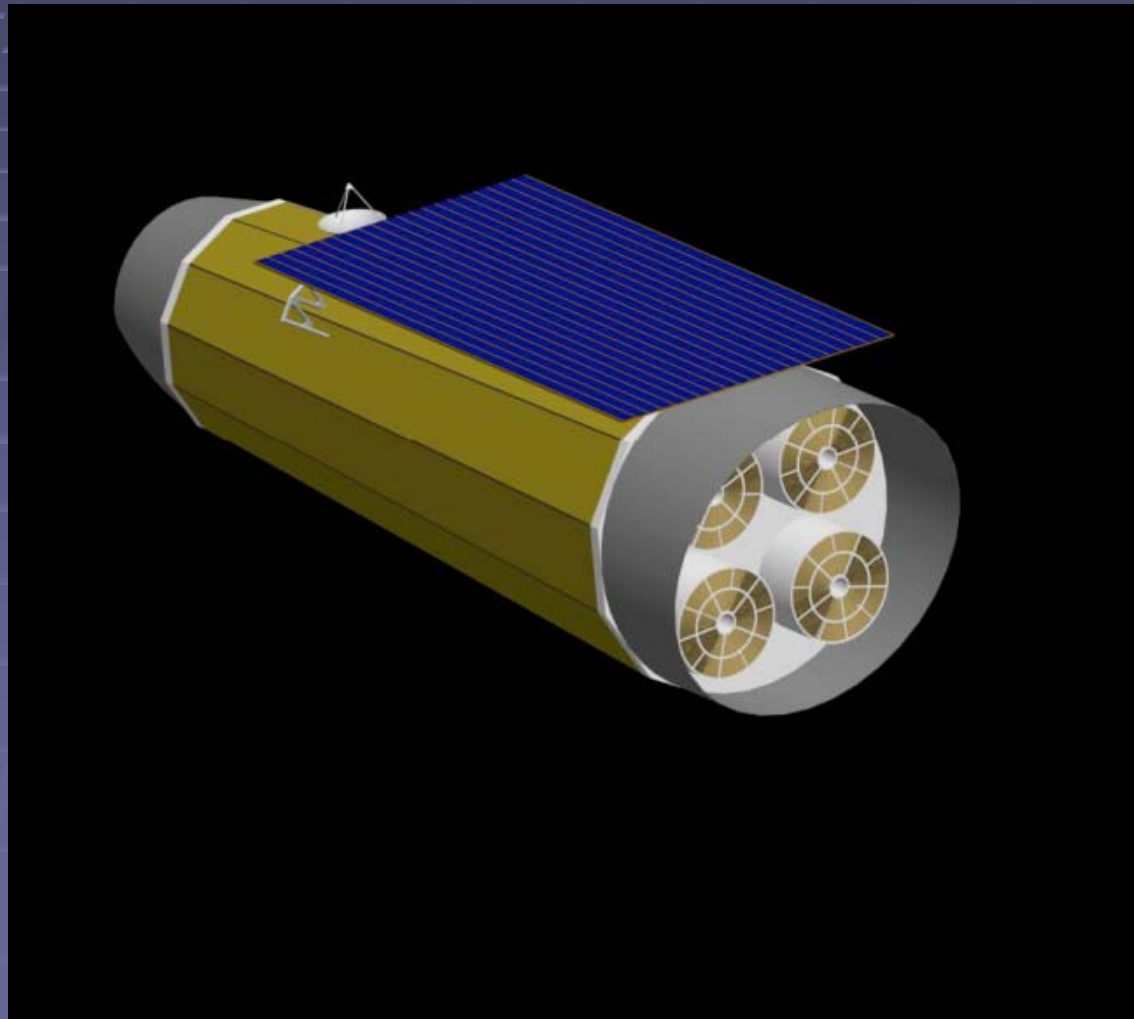
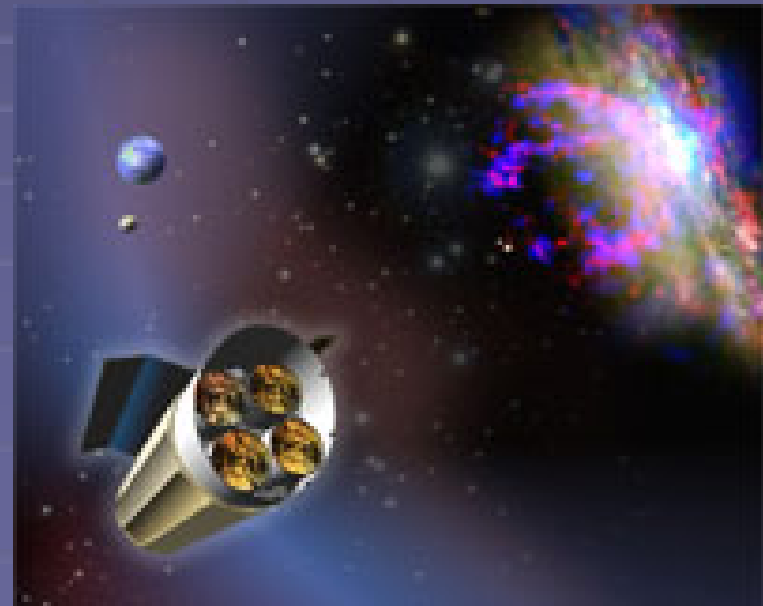


Constellation-X



In the Making!

- Initially supposed to be four separate telescopes working in unison to gain angular resolution advantages, but now they have all the units in only one satellite



Main Objectives

- Observe matter being pulled into Black Holes
- Investigate Dark Matter and Dark energy using galaxy clusters
- Cosmic Feedback (i.e. Accretion disk outflows)
- Test General Relativity

All the Other Stuff

Other X-ray emitters are:

- Neutron stars
- Super Nova remnants
- Cosmic Accelerators
- Any source of strong gravity

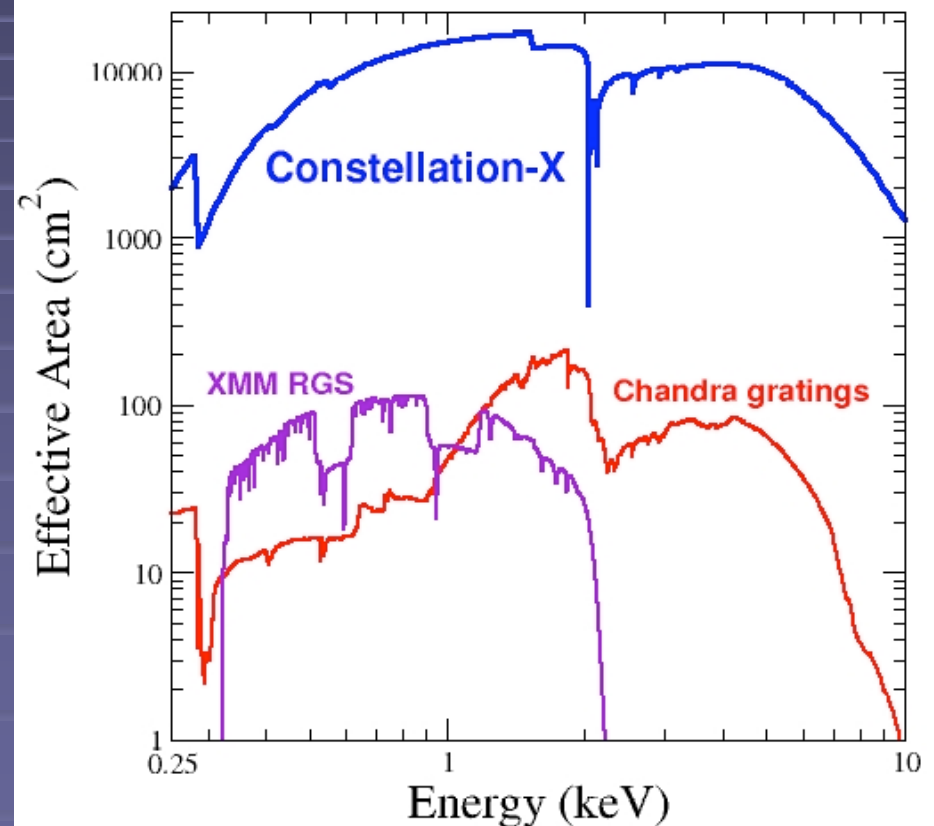
Viewing Abilities

- Resolution: 200-1500 (spectral)
- 50-100 times increased high resolution area
- Lowest acceptable resolution = 15 arcsecs (goal is 5)

Didn't we already have one of these?

- 50-100 times increased high resolution area over predecessors
- About 10 times more collecting area than Chandra

Comparison of X-ray mission collecting areas



Techno stuff

- Spectroscopy X-ray Telescope (SXT)

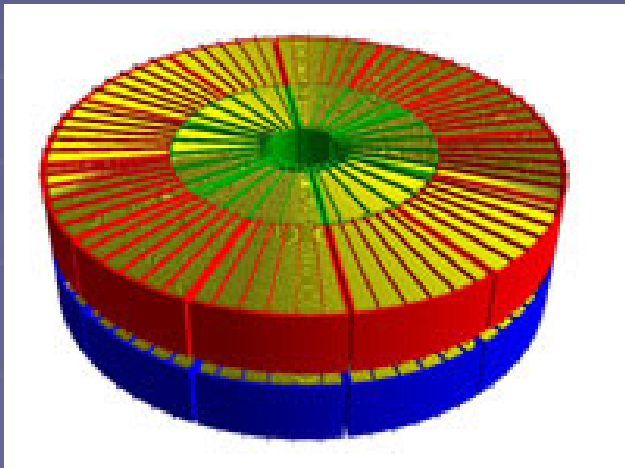
Grazing-incidence design

Inner and Outer “submodules”

127 mirror shells in inner

89 in outer

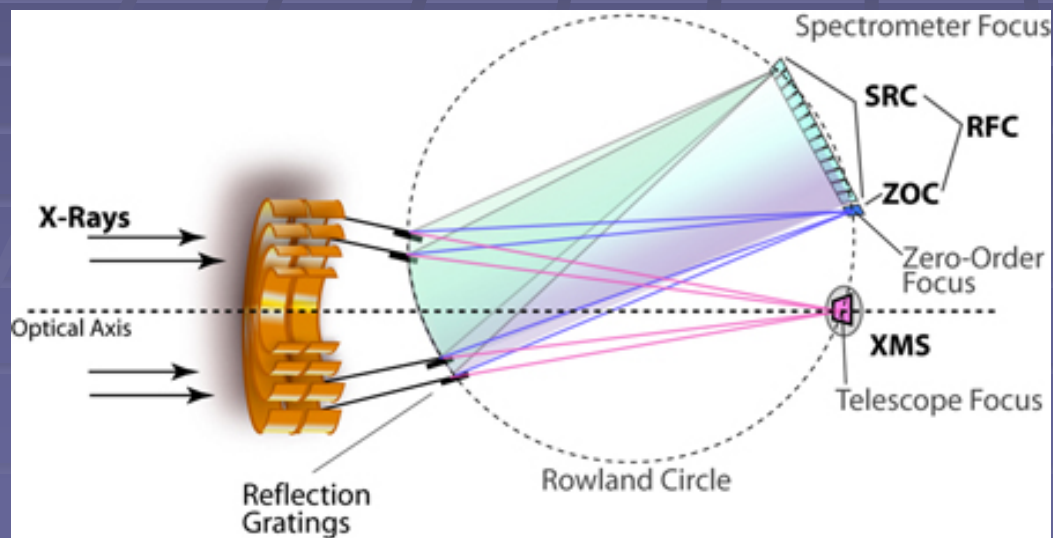
4 sets with 1.6 meter diameter



Hard X-ray Telescope (HXT)

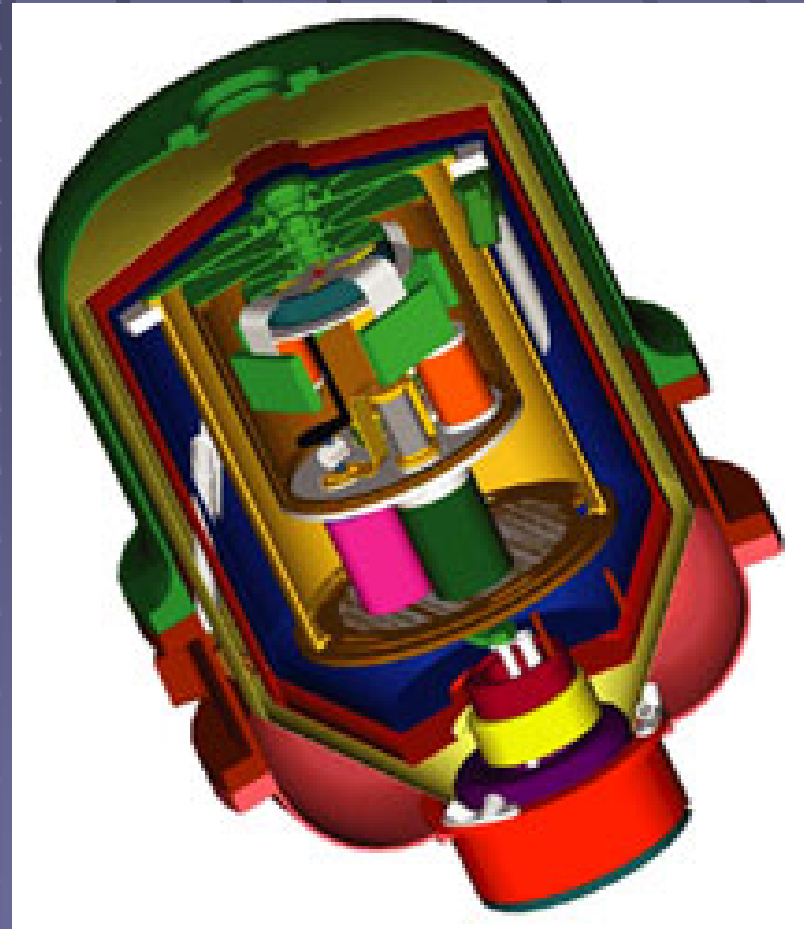
- Applies focusing to 10 – 40 keV range specifically.
- Used for non-thermal emission
- Need a shallower grazing incidence because these photons have a higher energy

Reflective Grating Spectrometer CCD Spectrometer Cryogenics Cooler



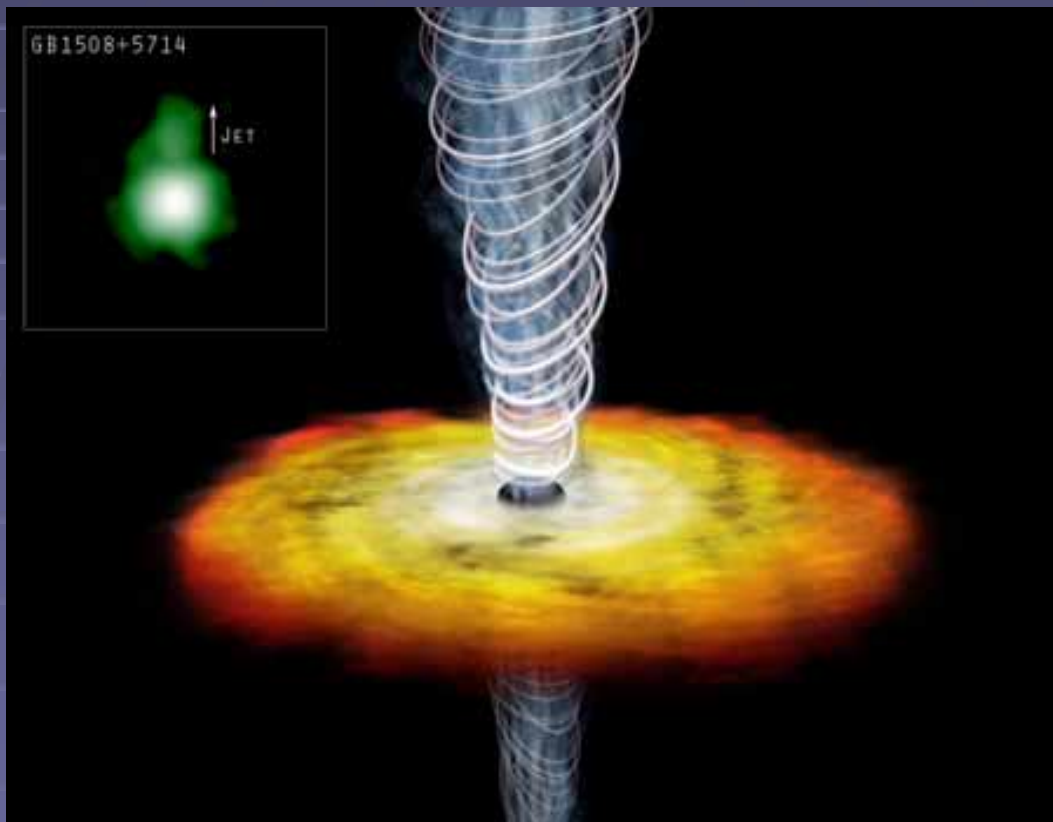
X-ray Microcalorimeter Spectrometer

- Detects individual X-ray photons thermally
- Is better than both CCD arrays (“20-40 times improved energy resolution”) and gratings (“5-10 better quantum efficiency”)



Black Hole stuff

- Looking for broad Fe K lines- better spectral resolution gives more specific data points instead of one broad line!
- Be able to better investigate velocities as things spiral into black holes
- Also looking further into “jets” that eject perpendicular to the accretion disks



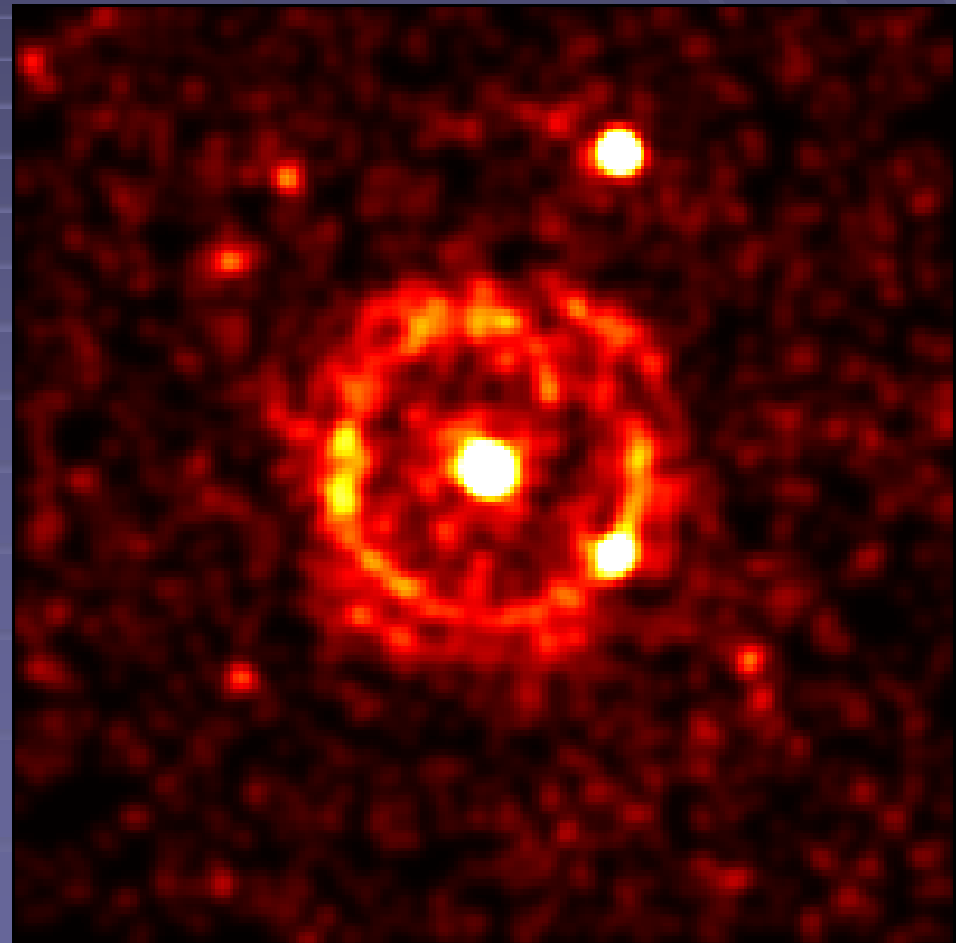
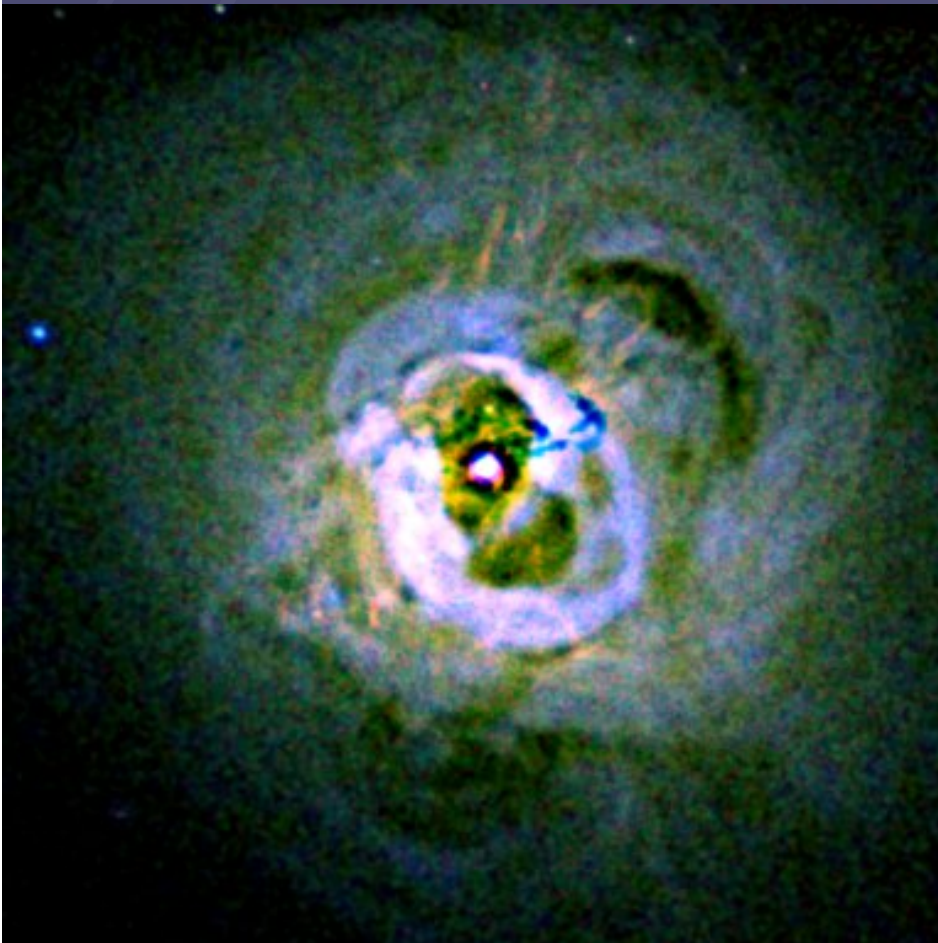
Dark Matter and Energy

- Use Galaxy Clusters as “standard candles” to determine distances.
- Constellation-X will focus on “measuring the absolute distances to clusters via direct and indirect means, thereby determining the transformation between redshift and true distance” as well as gaining, “direct mass measurements” of galaxy clusters (to investigate the mass/dark matter ratio= constant)
- Calorimeter is essential to the accurate mass measurements that Constellation-X can get.

Ooooooh...Aaaaaaaah

Perseus cluster

GRB 031203



Sources

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- Presentation by, H. Tananbaum and N. White