

IXO Science in the USA Decadal Survey

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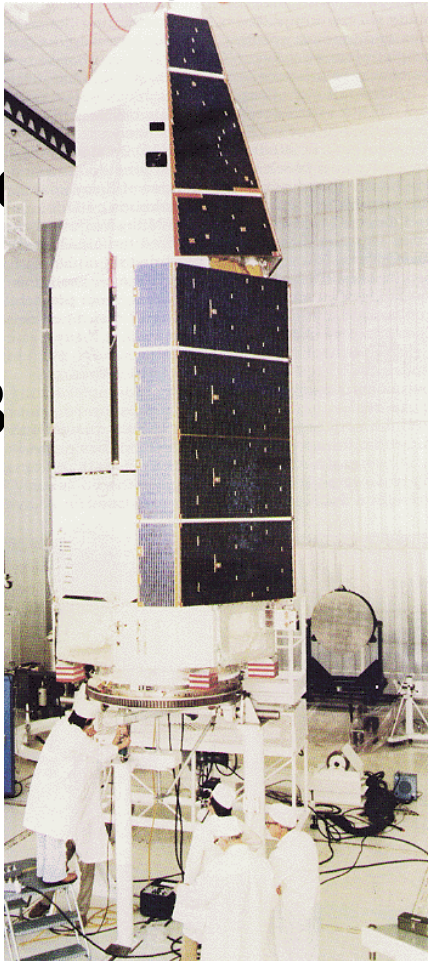
IXO Team Meeting Boston, Jan 2009

Improvement of IXO relative to Chandra/XMM/Suzaku

- >15x greater collecting area (1 keV)

- sensitivity of 5' square detector is 20x better

- sensitivity 3x better



- Ground-based equivalent:
- going from the 200" (5 m) to a 20 m telescope
- going from narrow-band photometry to an integral field spectrograph
- **ALL AT THE SAME TIME**



Some of the exciting science expected from IXO

- Black Hole Studies
 - spin of black holes (1 of formation predictions)
 - accretion physics (GR effects)
 - feedback into their surroundings
- Neutron Stars
 - mass-radius relationship (QCD)
 - polarization in magnetars (QED)



- Star Formation and Stars
 - ionization of the protostellar disk by X-rays
 - stellar wind modifies stellar atmospheres
- Clusters of Galaxies
 - cluster evolution with cosmic time
 - feedback in the cluster core
 - Tests of cosmological models (evolution, f_{gas})
- Cosmic Web of Baryons
- The Milky Way and Nearby Galaxies
 - SNR (element production and SNe model constraints)
 - Precision abundances of the elements and dust grain structure
 - Hot halo and Local Group gas

Astro2010: The Astronomy and Astrophysics Decadal Survey

- The Committee on Astro2010 will survey the field of space- and ground-based astronomy and astrophysics, recommending priorities for the most important scientific and technical activities of the decade 2010-2020.
- The principal goals of the study will be to carry out an assessment of activities in astronomy and astrophysics, including both new and previously identified concepts, and to prepare a concise report that will be addressed to the agencies supporting the field, the Congressional committees with jurisdiction over those agencies, the scientific community, and the public.

- Establish priorities, including missions, will be rank-ordered.
- First part of the approach: Assess the science
- Five Science Frontiers Panels
- The Planetary Systems and Star Formation (PSF): Lee Hartmann
- The Stars and Stellar Evolution (SSE): Roger Chevalier
- The Galactic Neighborhood (GAN): Mike Shull
- The Galaxies across Cosmic Time (GCT): Meg Urry
- The Cosmology and Fundamental Physics (CFP): David Spergel

- Review the science goals: request white papers on science (due Feb 9-15). Their charge is to:
- Identify new scientific opportunities and compelling scientific themes that have arisen from recent advances and accomplishments in astronomy and astrophysics;
- Describe the scientific context of the importance of these opportunities, including connections to other parts of astronomy and astrophysics and, where appropriate, to the advancement of our broader scientific understanding;
- Describe the key advances in observation and theory necessary to realize the scientific opportunities within the decade 2010-2020; and
- Considering the relative compelling nature of the opportunities identified and the expected accessibility of the measurement regimes required, **call out up to four central questions that are ripe for answering and one general area where there is unusual discovery potential** and that define the scientific frontier of the next decade in the SFP's sub-field of astronomy and astrophysics.

- Review of documents from late Feb - early May; presentation of report in 2nd week of May
- Programmatic review in June subcommittee: Electromag from Space (EOS)

