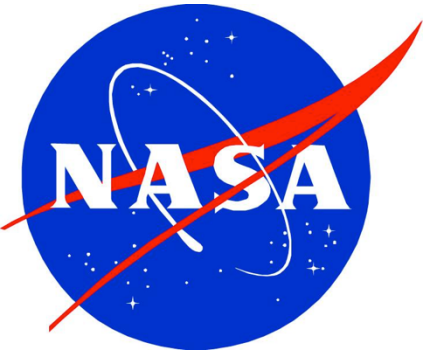
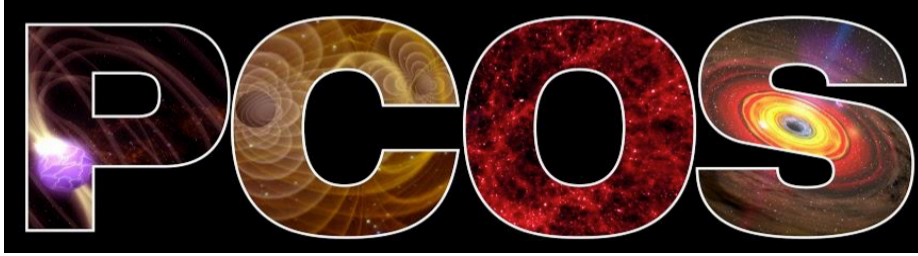




PCOS/PhysPAG Overview

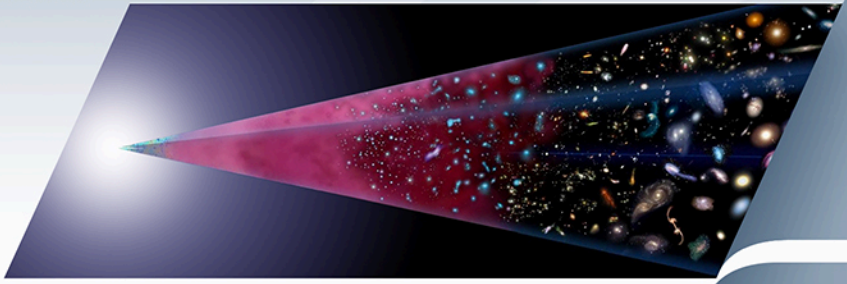
Terri Brandt
PCOS Chief Scientist

American Physical Society Meeting
14 Apr 2018

Why Astrophysics?

Astrophysics is humankind's scientific endeavor to understand the universe and our place in it.

How did our universe begin and evolve?



Physics of the Cosmos (PCOS)

How did galaxies, stars, and planets come to be?

Cosmic Origins (COR)

Are we alone?

Exoplanet Exploration (ExEP)

Program Office Themes

Enduring National Strategic Drivers

Physics of the Cosmos Program Office Purpose:
to explore some of the most fundamental questions regarding the physical forces and laws of the universe:

- the validity of Einstein's General Theory of Relativity and the nature of spacetime;
- the behavior of matter and energy in extreme environments;
- the cosmological parameters governing inflation and the evolution of the universe; and
- the nature of dark matter and dark energy.

Physics of the Cosmos spans the fields of high-energy astrophysics, cosmology, and fundamental physics, and includes a wide range of science goals. These include the following:

- General Relativity and the Nature of Spacetime
- Massive Black Holes and the Evolution of Galaxies
- Matter and Energy in the Most Extreme Environments
- Dark Energy
- Big Bang and the Evolution of the Universe

- Talk to Terri Brandt and Bernard Kelly at this meeting!
- **Stop by the PCOS table!**
- *More resources: https://pcos.gsfc.nasa.gov*

Activities are managed by the PCOS Program Office at NASA's Goddard Space Flight Center and reported to NASA Headquarters.
They include:

- Mission concept studies oversight
- Strategic technology maturation oversight (SAT)
- Community engagement, including via the Physics of the Cosmos Program Analysis Group (PhysPAG)

The PCOS Program Office hosts

- Athena Study Office
- LISA Study Office

and oversees

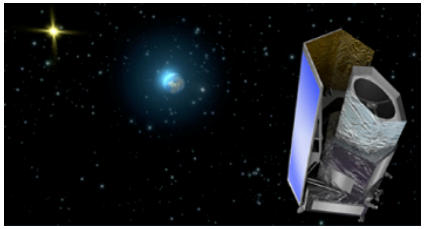
- science and
- technology activities

for NASA's contribution to these ESA-led missions.

Missions

Operating Missions:

Euclid ~2020
ESA-led Mission

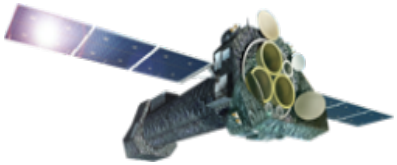


NASA supplying the NISP Sensor Chip System (SCS)

Chandra 1999
NASA Strategic Mission

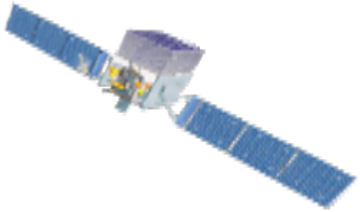
Chandra X-ray Observatory

XMM-Newton 1999
ESA-led Mission



X-ray Multi Mirror - Newton

Fermi 2008
NASA Strategic Mission



Fermi Gamma-ray Space Telescope

And,

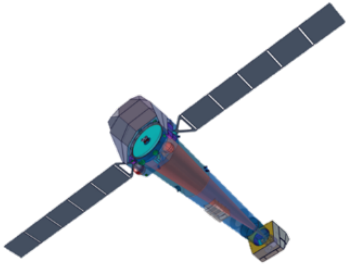
- Particle astrophysics
- Gamma-ray (MeV+)
- X-ray
- Inflation probe
- Cosmic Structure
- Gravitation waves

From all platforms!

- Satellites,
- the ISS,
- Balloons,
- Sounding rockets, …

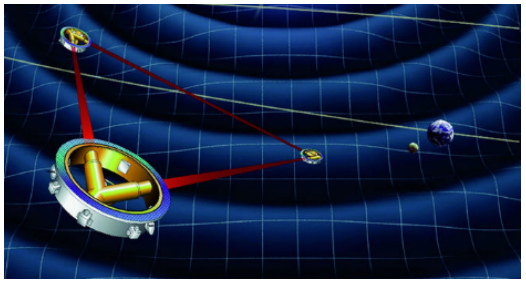
Missions in Pre-formulation:

Athena Late 2020s
ESA-led Mission



NASA is supplying elements for both instruments
Science team members

LISA Mid 2030s
ESA-led Mission



NASA is developing technology for both the payload and the mission
NASA LISA Study Team