

Imaging X-Ray Polarimetry Explorer

# IXPE

The Imaging X-Ray Polarimetry Explorer (IXPE) mission measures the polarization of cosmic X-rays to improve our understanding of the fundamental physics of extreme and exotic objects in the universe, such as stellar and supermassive black holes, neutron stars and pulsars. By studying polarization of emitted X-rays, scientists are able to understand the physics of objects they have never explored before.



IXPE rendering

**BAE SYSTEMS**

## Overview

IXPE flies three space telescopes with polarization-sensitive detectors, enabling the observatory to measure polarized X-rays from astronomical objects with scientifically meaningful spatial, spectral and temporal resolution. For example, this mission allows for a new and unique way of looking at the geometry of extreme magnetic fields over a wide range of spatial scales, from the polar jets of Active Galactic Nuclei, to the near-surface of extremely magnetic neutron stars called "magnetars."

By studying the polarization of emitted X-rays, IXPE is helping scientists make breakthrough discoveries in fundamental physics of extreme celestial objects and the physical phenomena that have never been explored. This supports NASA Science Mission Directorate's goal "to probe the origin and destiny of our universe, including the nature of black holes, dark energy, dark matter and gravity." IXPE is part of NASA's Astrophysics Small Explorers (SMEX) Program and is a collaboration between NASA's Marshall Space Flight Center, the Italian Space Agency and BAE Systems.

## Our Role

BAE Systems provided the Evolve spacecraft, mechanical and structural elements of the payload, observatory assembly, integration and test and mission operations for IXPE.

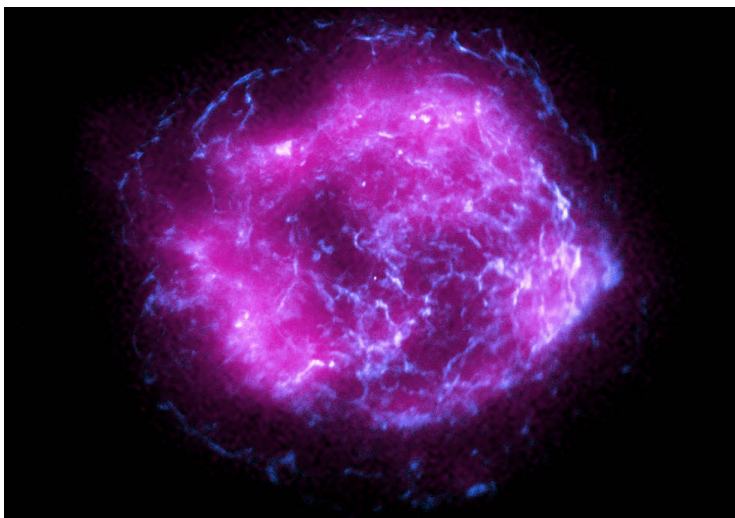
As the spacecraft provider, BAE Systems leveraged our spacecraft heritage of exceeding mission design life. The Evolve spacecraft has a broad spectrum of capabilities, is highly-reliable with proven stability and pointing performance, which are essential for astrophysics missions.



IXPE hardware in its operational configuration (no solar panels)

## Quick Facts

- Features three identical telescopes, each with a Mirror Module Assembly and a polarization-sensitive Detector Unit
- IXPE's telescopes have a 4-meter focal length, made possible by a high-precision deployable boom
- IXPE launched on December 9, 2021, completed its two year baseline mission and continues to deliver award-winning science into multiple mission extensions.
- IXPE measurements will provide new dimensions for probing a wide range of cosmic X-ray sources
- Students and professionals operate the IXPE spacecraft from the University of Colorado Boulder's Laboratory for Atmospheric and Space Physics (LASP)



Top image: Supernova remnant Cassiopeia A – the first X-ray data collected by IXPE. Credit: NASA/CXC/SAO/IXPE; Bottom image: IXPE vib testing