

# IXPE



## Imaging X-Ray Polarimetry Explorer

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 super massive black holes, neutron stars and pulsars. By studying polarization of X-rays emitted, scientists will be able to better understand the physics of objects they have never explored before.



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## 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 X-rays emitted, IXPE will help scientists understand the 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.”

## Our Role

Ball provided our Ball Configurable Platform (BCP)-Small spacecraft, mechanical and structural elements of the payload, observatory assembly, integration and test and mission operations for IXPE.

As the spacecraft provider, Ball leveraged its BCP heritage, a satellite bus that has a history of exceeding mission design life. The BCP has a broad spectrum of capabilities, is highly-reliable with proven stability and pointing performance, which are essential for astrophysics missions.

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 Ball.



*Supernova remnant  
Cassiopeia A - the first X-ray  
data collected by IXPE.  
Credits: NASA/CXC/SAO/IXPE*

## Quick Facts

- Features three identical telescopes, each with a Mirror Module Assembly and a polarization-sensitive Detector Unit
- Dr. Martin Weisskopf is the principal investigator at NASA’s Marshall Space Flight Center in Huntsville, Alabama
- IXPE measurements will provide new dimensions for probing a wide range of cosmic X-ray sources
- IXPE uses X-ray polarimetry, which is the measurement and interpretation of the polarization of electromagnetic waves, to improve our understanding of how X-ray emissions are produced in objects
- Students and professionals operate the IXPE spacecraft from the University of Colorado Boulder’s Laboratory for Atmospheric and Space Physics (LASP)



*Top image:  
IXPE acoustic  
testing;  
Bottom image:  
IXPE vibrate  
testing.*



**Ball Aerospace**

303-939-4000 • Fax: 303-939-6104

info@ballaerospace.com • www.ball.com/aerospace