

Imaging X-ray Polarimetry Explorer (IXPE) Mission Overview

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on behalf of the IXPE Team



IXPE completed 2-year prime mission in Feb 2024

- Executed 115 observations of 64 distinct sources
- 147 refereed publications on IXPE science (as of April 2024)

IXPE is now in General Observer phase

- For cycle 1, oversubscription in observing time > 6
- Over 1400 co-Is, 1/3 of proposals part of student theses
- 99 distinct targets, includes source classes beyond prime mission
- Have conducted 20 observations of 11 targets.
- Plan to conduct 15 Ms of GO observations in cycle 1.
- ToOs are highly oversubscribed ($\sim 14\times$). Allyn will discuss scheduling and ToOs.

Joint Programs

For cycle 2

- Continuing joint program with NICER (300 ks)
- Adding joint programs with NuSTAR (500 ks) and Swift (200 ks) for cycle 2
- Swift GO cycle 21 will award IXPE time (200 ks, one medium ToO).

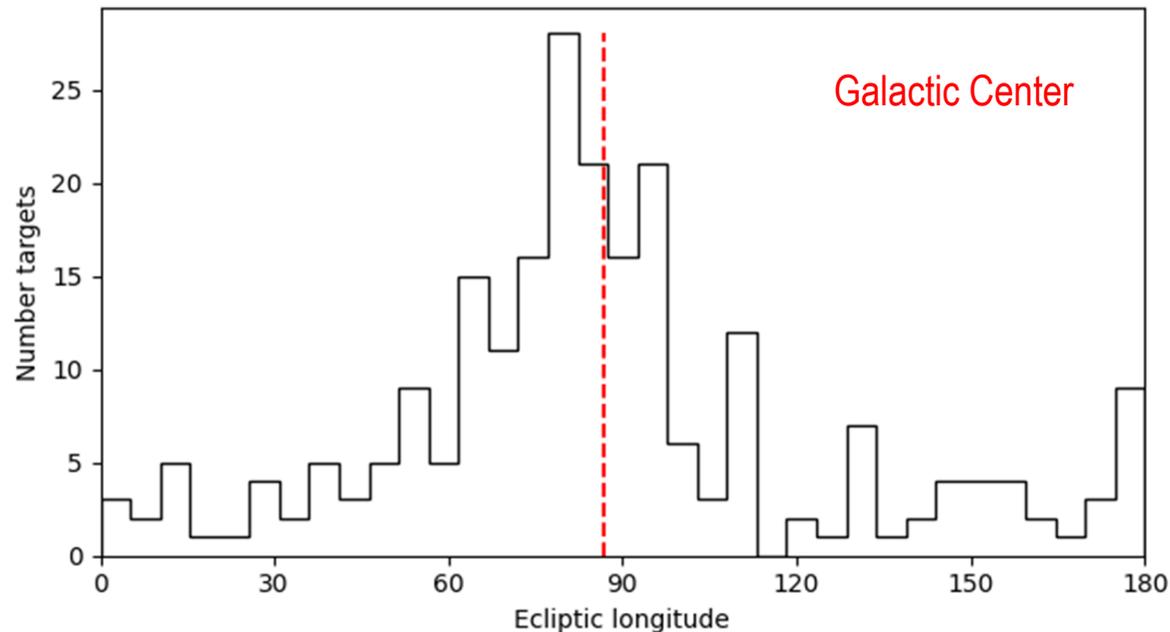
For cycle 3 and beyond

- Plan to add joint program with NRAO for cycle 3
- NRAO will award IXPE time (300 ks)
- GO review panels expressed interest in optical polarimetry

IXPE Status

Increased solar angle range from $\pm 25^\circ$ to $\pm 34^\circ$ in early 2024

- Increases temporal coverage for ToOs
- Will help deal with crowding of targets towards Galactic center
- Still encourage targets away from GC, best within 34° of an ecliptic pole



IXPE Status

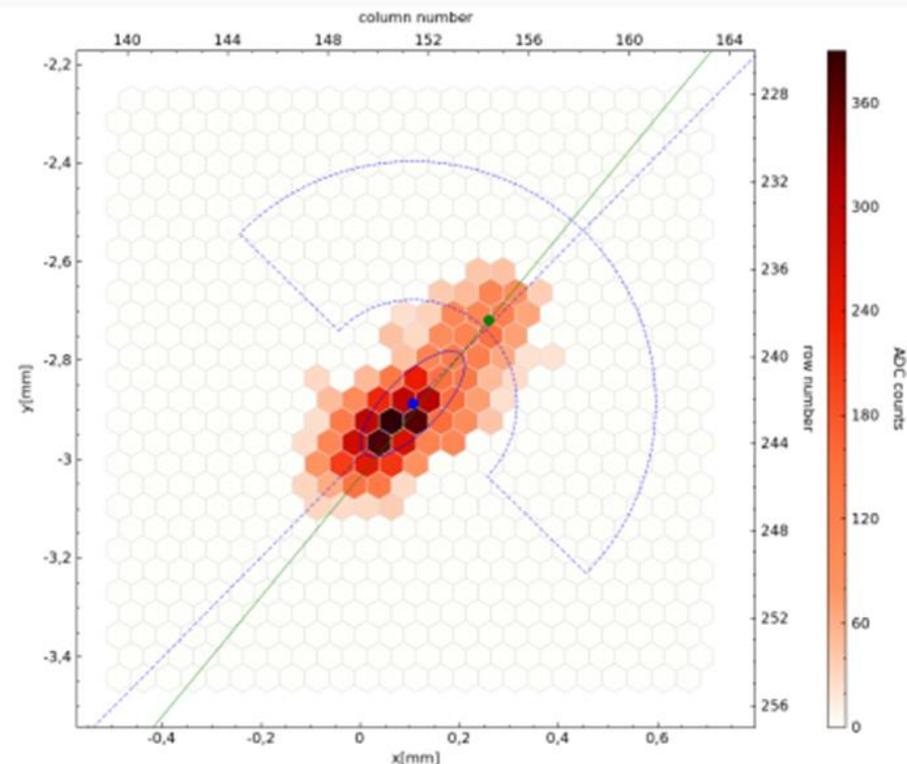
- IXPE is operating well
 - Only 2 anomalies that caused loss of observing time
 - Both related due to loss of valid telemetry
 - Ball Aerospace (now BAE Systems) investigating root cause and faster recovery
- Studying expected mission lifetime in advance of senior review
 - Battery lifetime is key, have implemented several measures to increase lifetime
 - MSFC is confident battery can operations through end of FY28 (senior review period)
 - BAE and battery vendor are studying four additional configuration changes to extend lifetime beyond FY28

Instrument/Calibration Status

- Instrument health is good.
- Compensate for gradual decrease in gas pressure by occasionally changing high voltage.
- Continually evaluating calibration and background.
- Doug Swartz will discuss calibration updates to date.

Future plans:

- Correction for GEM charging (for bright sources)
- Neural network X-ray image analysis
- Reprocess data with new calibrations
- **Do not have enough people for this work.**



Proposal/data analysis workshops (all organized by Kavitha Arur)

- March 2023 – Special session at HEAD meeting
- June 2023 – Special session at Summer AAS
- Sept 2023 – Virtual workshop
- April 2024 – Special session at HEAD meeting
- July 2024 – NICER/IXPE hybrid workshop

Science sessions and meetings

- March 2023 – HEAD meeting IXPE science session
- June 2023 – Science talk at APAC
- July 2023 – Two days of polarimetry at European Astronomical Society meeting
- April 2024 – HEAD meeting sessions on blazars, accreting stellar mass black holes
- July 2024 – Two days of polarimetry at COSPAR
- July 2024 – IXPE extended sources session at European Astronomical Society meeting
- Sept 2024 – International X-ray POLarimetry Symposium (IXPO) in Huntsville, AL

Future Timeline

- Currently funded to end of FY25 (30 Sept 2025), covering 2/3 of cycle 2.
- Will request 3-year mission extension in Senior Review
- Funding would be to end of FY28 (30 Sept 2028) covering end of cycle 2, cycle 3, cycle 4, and 2/3 of cycle 5.

Expected timeline for Astrophysics Division Senior Review of Operating Mission

- Call for proposals – Sept 2024
- Budget submission – Nov 2024
- Proposals due – Feb 2025
- “Rest of Missions” Panel review – March/April 2025
- Special Astrophysics Advisory Committee meeting – May 2025
- NASA response – May or June 2025

Materials from 2022 Senior review at:

<https://science.nasa.gov/astrophysics/resources/documents/2022-senior-review-operating-missions/>

Budget and Impact on GO Funding

IXPE budget reduced by \$1.5M for FY25, flat for outyears

- Will impact staffing at MSFC and GSFC

Impact on GO funding

- Priority to fund US-led, highly-rated observing proposals.
- Now fund cat A/Large, cat C, US co-Is with non-US PI, and theory.
- In cycle 3 plan to eliminate theory and reduce US co-I funding.
- In cycle 4 plan to eliminate US co-Is funding.

“Overguide” request for Senior Review proposal for GO funding and analysis/calibration improvements.

Cycle	GO Funding
1	\$2.9M
2	\$2.9M
3	\$2.1M
4	\$1.7M
5	\$1.6M