UPGRADING THE ADVANCED **PHOTON SOURCE**

Built as part of the APS Upgrade project, two experiment stations in the Long Beamline Building will revolutionize materials science and energy storage research.



The newly built Long Beamline Building will house two new beamlines: the High Energy X-ray Microscope (HEXM) and the In Situ Nanoprobe (ISN).

The upgrade of the Advanced Photon Source (APS) has already delivered its most externally visible element: the Long Beamline Building. This 24,000-square-foot facility was completed in June 2022 and will house two of the project's feature beamlines: the High Energy X-ray Microscope (HEXM) and the In Situ Nanoprobe (ISN). HEXM will focus on materials science and engineering, tracing tiny defects in current and novel materials as they form. Its long focal length and large end station will provide world-leading imaging capabilities to zoom in and out of samples as large as a centimeter. ISN will be used to create longer-lasting batteries and solar cells with its ability to spot and identify nanoscale material changes under in-situ and operando conditions. Its large working distance enables the observation of complex devices as they operate.



HEXM Key Specifications

35-120 keV Photon beam energy Distance from source 70-180 m X-ray spot size 200 nm Working distance 1 m Wide-and small-angle Techniques scattering, coherent diffraction, absorption- and diffraction-based tomography

HEXM and ISN are 3 times longer than **APS** average beamline, providing optical flexibility to produce both large and extremely small X-ray spot while maintaining large working distances. Both beamlines projected to finish their commissioning periods and be open for first experiments in 2024.



ISN Key Specifications

4.8-30 keV Photon beam energy Distance from source 220 m X-ray spot size 20 nm Working distance 55 mm Nano-X-ray fluorescence **Techniques** imaging in 2D and 3D, sub-10mm ptychography, nano

Follow the APS Upgrade Project at aps.anl.gov/APS-Upgrade

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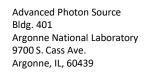
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diffraction, nano-XBIC and XBIC