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Dissecting Blazar Emission with IXPE: A Polarimetric Survey of BL Lac Objects

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BL Lacertae (BL Lac) objects are a subclass of active galactic nuclei whose emission is dominated by relativistic jets aligned closely with our line of sight. Their X-ray emission arises primarily from synchrotron or inverse Compton processes, and polarization measurements in this regime offer a direct probe of jet magnetic field geometry and emission mechanisms. The Imaging X-ray Polarimetry Explorer (IXPE) enables the first sensitive measurements of X-ray polarization in such sources, opening a new observational window into jet physics.
We present a systematic and uniform analysis of IXPE observations of BL Lac objects, combining previously published results with newly available multi-epoch data. Our study investigates temporal variations in polarization degree and angle, and explores correlations with spectral properties and Compton dominance derived from broadband spectral energy
distributions.
This work aims to understand how X-ray polarization evolves with activity state, photon energy, and blazar subclass, alongside lower-energy polarization behavior. The findings provide important constraints on jet composition, magnetic field structure, and emission region geometry. Results from this comprehensive polarimetric study will be presented and discussed at the conference.

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