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Insights into the high-energy emission of blazars from the first combined VHE and X-ray polarization measurements

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Blazars have been studied for more than half a century, but they are still far from being understood. The advent of new instrumentation brings new perspectives that are starting to help out unravelling the insights of these powerful cosmic accelerators. One of the novel facilities is the IXPE satellite, that reported the first measurement of X-ray polarization in blazars in the year 2022, thus opening a new window for testing acceleration and radiation models. In the conference, I will present results from extensive multi-instrument observations of two bright and nearby blazars, Mrk421 and Mrk501, that include, for the first time, data from simultaneous observations performed IXPE and with MAGIC. The IXPE observations spanned over months, and were simultaneous to the observations performed with other instruments (including XMM, NuSTAR and MAGIC), which permitted variability and correlation studies on timescales ranging from weeks down to hours. Building on the IXPE results, that indicate an energy-stratified jet, we employ a multiple-zone model to describe the radio-to-VHE spectrum, and to explain the multi-wavelength polarization trends observed in the data.

Primary author: PANEQUE, David (Max Planck Institute for Physics)

Co-authors: ARBET-ENGELS, Axel; SCHMUCKERMAIER, Felix; LIODAKIS, Ioannis; HECKMANN, Lea

Presenter: PANEQUE, David (Max Planck Institute for Physics)

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