

## Stringent axion constraints with Event Horizon Telescope polarimetric measurements of M87\*

The hitherto unprecedented angular resolution of the Event Horizon Telescope (EHT) has created exciting opportunities in the search for new physics. Recently, the linear polarization of radiation emitted near the supermassive black hole M87 was measured on four separate days, precisely enabling tests of the existence of a dense axion cloud produced by a spinning black hole. The presence of an axion cloud leads to a frequency-independent oscillation in the electric vector position angle (EVPA) of this linear polarization. For a nearly face-on M87, this oscillation in the EVPA appears as a propagating wave along the photon ring. We propose a novel differential analysis procedure to reduce the astrophysical background, and derive stringent constraints on the existence of axions in the previously unexplored mass window  $\sim(10^{-21} - 10^{-20})$  eV.

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