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Polarimetric observation to hunt axion dark matter

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Identification of dark matter has been an outstanding problem in physics and astronomy for decades. We found that the polarimetric observations of protoplanetary disks provides a one of the most sensitive probes of a well-motivated candidate for dark matter, axion. Since axion dark matter causes the rotation of the linear polarization plane of photon (i.e. birefringence), it should deform the concentric polarized pattern of protoplanetary disks. Using a polarimetry observation data taken in 2011, we put the best constraint on axion dark matter. We will shortly improve it with our own new observations.

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