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POLARIMETRIC MONITORING OF BLAZARS AT SAN PEDRO MÁRTIR

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The "Polarimetric Monitoring of Blazars at San Pedro Mártir" started in 2008 and its main goal is to obtain photo-polarimetric *R*-band data on a sample of 32 bright gamma-ray blazars. Observations for this project were obtained using the image polarimeter POLIMA (Hiriart et al. 2005) attached to the 84 cm telescope at the Observatorio Astronómico Nacional at San Pedro Martir, B.C., Mexico.

POLIMA consists of a rotating Glan-Taylor prism driven by a stepper motor. As the polarimeter is a single-beam device with a very slow modulation, photometric conditions are required for accurate polarimetry. The sample was divided in high and low priority objects, depending on the variability state and brightness. Due to our telescope size, we tried not to observe objects when they were fainter than 16.5 mag. Depending on their visibility, objects were observed during seven consecutive nights each month. Polarization measurements were obtain during dark-time conditions. Data were reduced with a software pipeline developed by D. Hiriart for this project. The instrumental polarization was determined by observing unpolarized standard stars and it was found to be $(0.6 \pm 0.5)\%$. We used polarized and unpolarized standard stars from Schmidt et al. (1992). Flux calibration was done using standard photometric stars on the same image fields.

We present, as an example, our results obtained for the gamma ray-blazar PKS 2155-304 ($z = 0.116$). This object is a HBL (Ikejiri et al. 2009) with a peak frequency synchrotron $\log \nu^{S}_{\rm pk} = 12.9$, radio-optical spectral index $\alpha_{\rm ro} = 0.22$ (Abdo et al. 2010), duty cycle of 31.2%, and a Lorentz factor $\Gamma \sim 3$ (Dominici et al. 2006). Figure 1 shows the light curves in the *R*-band, linear polarization percentage, and polarization position angle obtained during 34 observing points for this blazar. The variability time-scale obtained from our observations is about $t_{\rm var} \sim 6.7$ days. Therefore, in the *R* band, using this scale and following Hagen-Thorn et al. (2008) we found that the magnetic field intensity for the source is $B = 0.09$ G. Time-scale analysis, including duty-cycle, magnetic field properties and possible correlations with the activity of the sources at other frequencies will be shown in a forthcoming paper (Sorcia et al. 2011, in preparation).

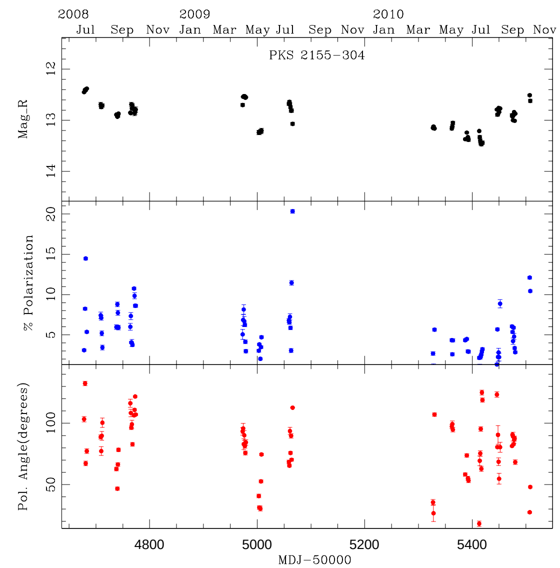

Fig. 1. Variability of the total flux (upper panel), polarization degree (middle panel), and vector position angle (lower panel) of the blazar PKS 2155-304 from 2008 to 2010.

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