

RoboPol Preliminary observations

Skinakas • IUCAA • St. Petersburg

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on behalf of the RoboPol collaboration

Skinakas Observatory

06.2012

Source selection criteria

- γ -ray bright \rightarrow Flux limited 2FGL catalogue
- γ -ray variable \rightarrow Variability index ≥ 41.64
- Optically bright \rightarrow Archival magnitude ≤ 18
- Observational constraints
 - Observable for 3 consecutive months because PA swing events last up to 20 – 30 days
 - Airmass limit = 2
 - Twilight

Initial (flux limited) sample: 557 sources

86 of them fulfill the aforementioned criteria **for June**

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Observations

72 sources observed ($\sim 10 - 12$ sources/night)

Method: Target fields sampled once for SNR ~ 50 in both filters

Standard fields sampled several times/night for better calibration and AM coverage

Bias & Flats in both filters taken for every night

Weather: Very good seeing conditions (0.9 – 1.5")

Lost most of 7th night (June 19) due to bad weather

Technical problems: Smooth telescope behavior

Minor focusing problems

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Data reduction

68 sources reduced (R & B mags)

Method: 2 filter (B, R) aperture photometry

IRAF package with the following pipeline:

1. (Master) bias subtraction
2. (Master) flat division (B, R)
3. Instrumental magnitudes using an inner aperture of (3-4)xFWHM and an outer ring at ~5xFWHM distance with 5-pixel width
4. Atmospheric extinction correction of both target and standard fields
5. Final magnitudes with standard field calibration

$$m_o = m + K_\lambda \cdot X$$

$$R = R_{obs} + c_1 \cdot (B - R) + c_2$$
$$(B - R) = c_3 \cdot (B - R)_{obs} + c_4$$

Data reduction

Error estimation: Used the reduced standard fields' magnitudes

Standard deviation of $R-R_{st}$

Standard deviation of $(B-R)-(B-R)_{st}$

Formal error propagation for B:

$$B = R + (B - R)$$
$$err(B) = \sqrt{err(R)^2 + err(B - R)^2}$$

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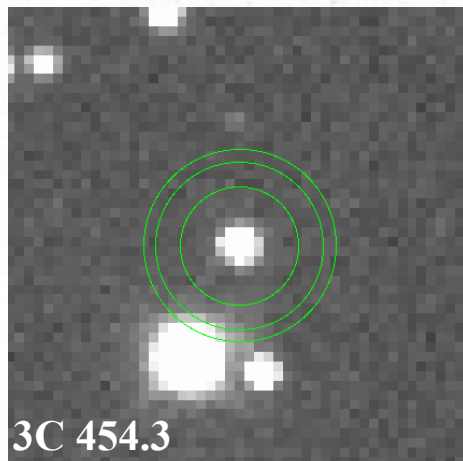
Verification • Cross-check

O. G. King: Pipeline results

Source	USNO R1	USNO R2	PTF R
BL Lac	13.79 +/- 0.09	14.11 +/- 0.12	13.92 +/- 0.03
3C454.3	15.59 +/- 0.10	15.98 +/- 0.05	

2-filter reduction results

Source	R _{mag}	B _{mag}
BL Lac	13.74 +/- 0.07	15.31 +/- 0.08
3C454.3	16.41 +/- 0.02	17.20 +/- 0.02



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Verification • Cross-check

J. Smith: Steward Observatory (University of Arizona)

<http://james.as.arizona.edu/~psmith/Fermi/>

Source	V_{mag}
CTA 102	16.5 +/- 0.03
3C 454.3	16.67 +/- 0.03

On the same day, we get:

Source	R_{mag}	B_{mag}
CTA 102	16.20 +/- 0.02	17.11 +/- 0.14
3C 454.3	16.41 +/- 0.02	17.20 +/- 0.02

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Source	R_{mag}	B_{mag}
CTA 102	16.20 +/- 0.02	17.11 +/- 0.14
3C 454.3	16.41 +/- 0.02	17.20 +/- 0.02

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10.2012

Source selection criteria

61 of the initial sample fulfill the criteria for **October**

20/61 were already observed back in June

Effective sample size: 41 sources

Observations

21 sources observed (21 sources/night)

Method: Same with Junes but more sources because

- Longer night
- Lower SNR (~25)

Weather: Very bad, only 1 night of observations

IUCAA Girawali Observatory

12.2012

Expand preliminary observations to get also polarization information

Sample selection

1. Not in the Smith catalog to extend the polarization database.
 2. The most variable gamma variable sources
 3. Archival magnitude ≤ 18
 4. Prioritized sources which are in the F-GAMMA sample
 - Radio data already available
- Sample size: 45

Crimean Astrophysical Observatory

01.2013

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 2. The most variable gamma variable sources
 3. Archival magnitude ≤ 18
 4. Prioritized sources which are in the F-GAMMA sample
 - Radio data already available
- Sample size: 72