RoboPol: Blazar Astrophysics from Skinakas with a Unique Optical Polarimeter

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on behalf of the RoboPol Collaboration
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Collaboration

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NCU/Torun:

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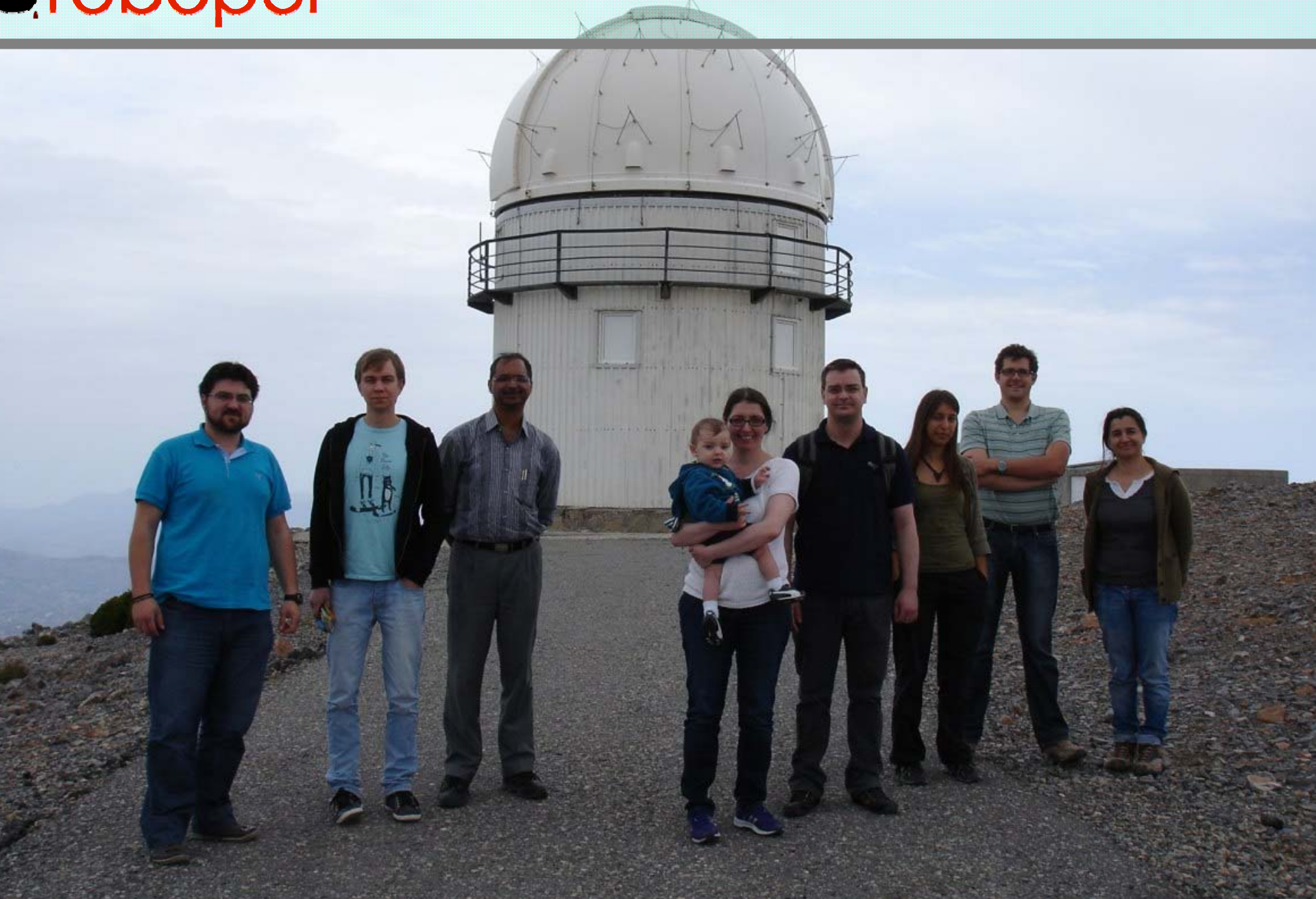
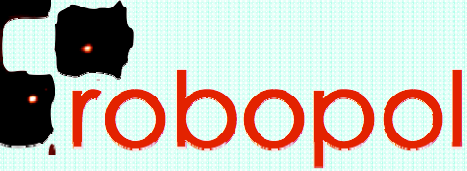
Collaboration



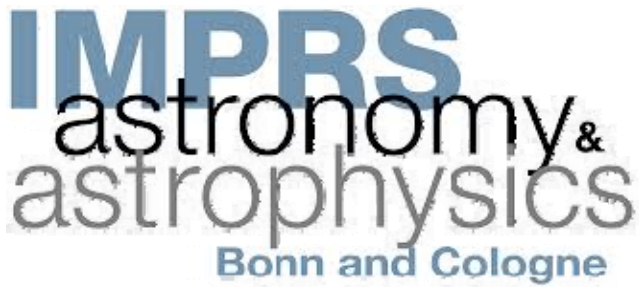
A nod to our sponsors



ropean Union
opean Social Fund

MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS
MANAGING AUTHORITY

Co- financed by Greece and the European Union



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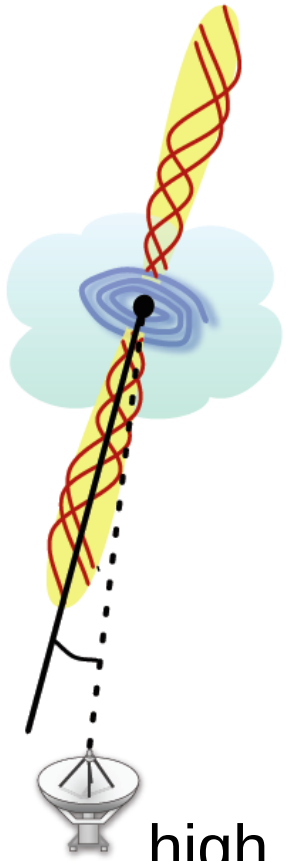
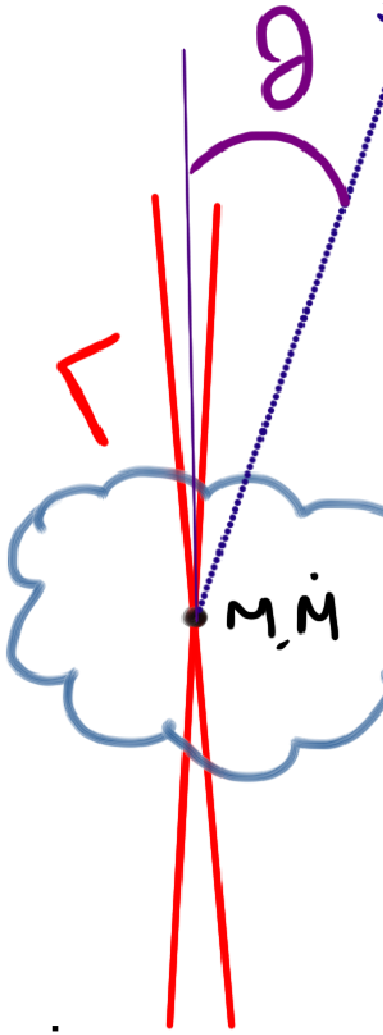
Blazars

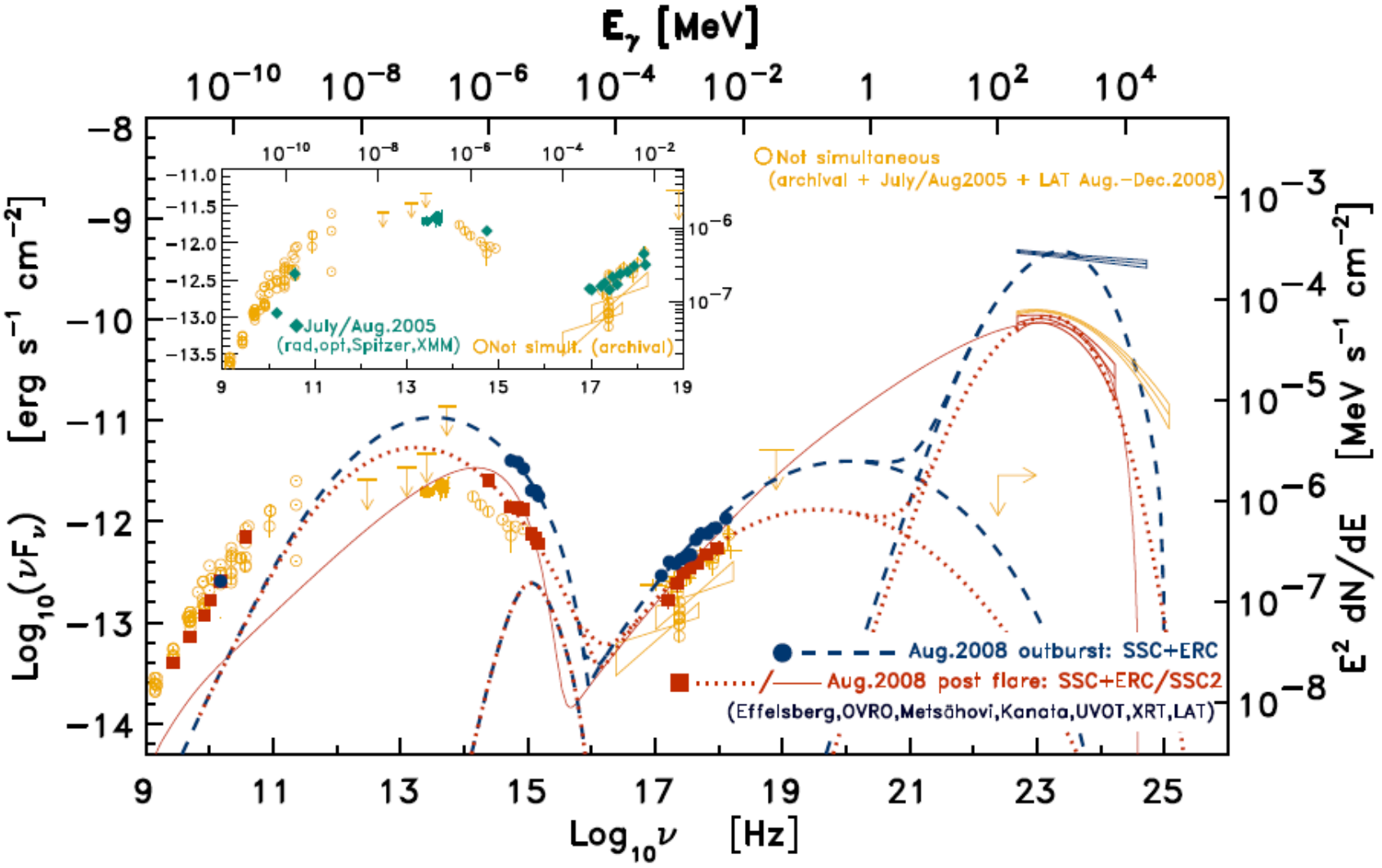




beamed & boosted

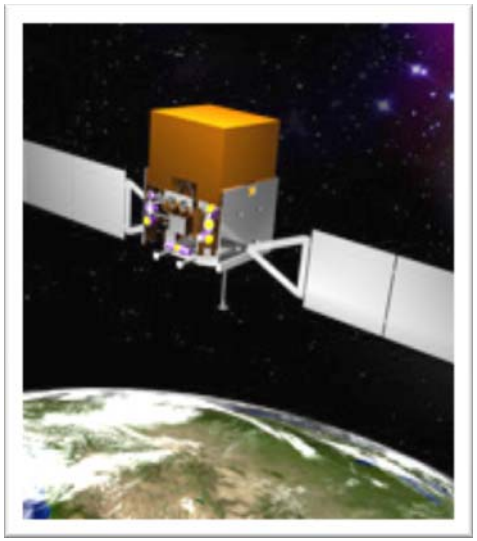
- fast variability
- superluminal motions
- high apparent luminosity
- high-energy emission

Blazar Spectra



PKS 1502+106, Abdo et al. 2010

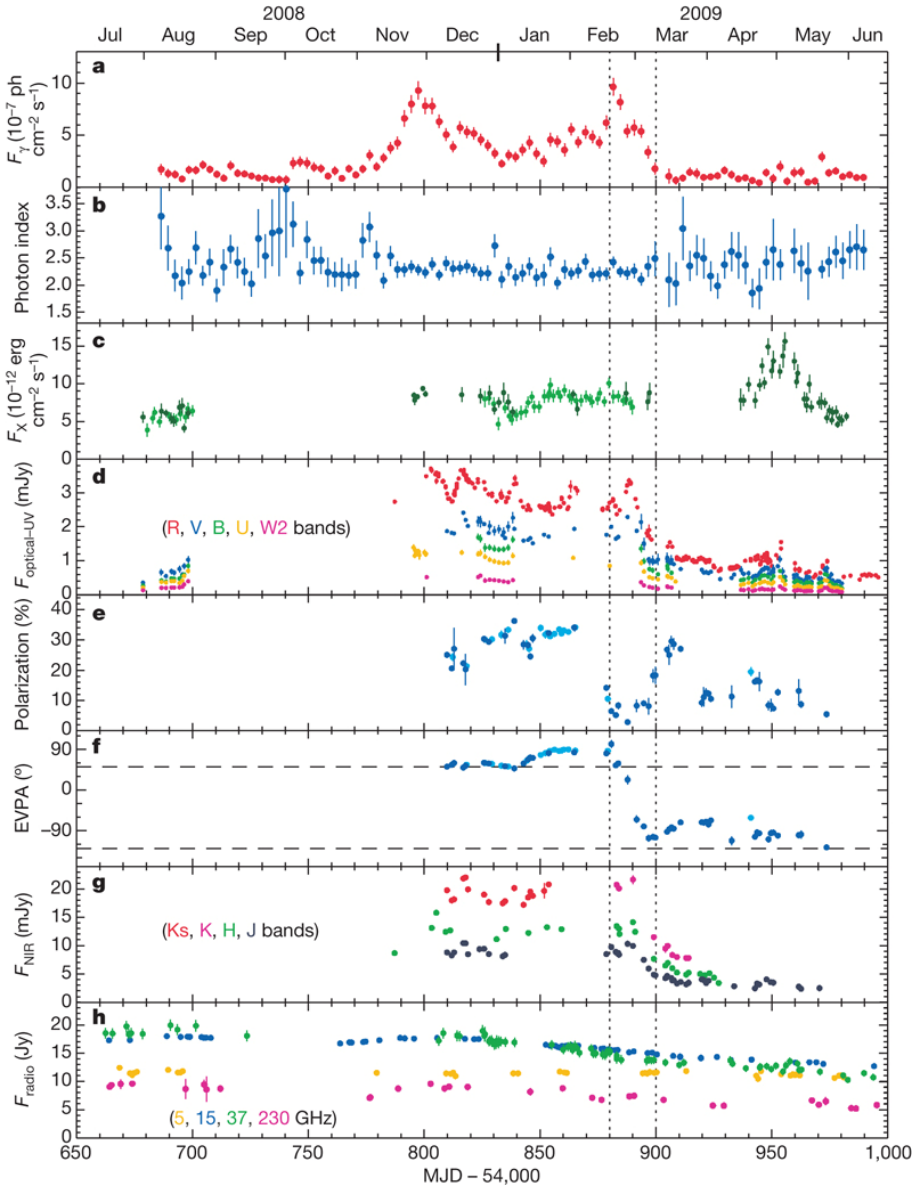
Blazar GeV coverage



Fermi
Gamma-ray
Space Telescope

Blazar Variability

3C279



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Blazar Optopolarimetr

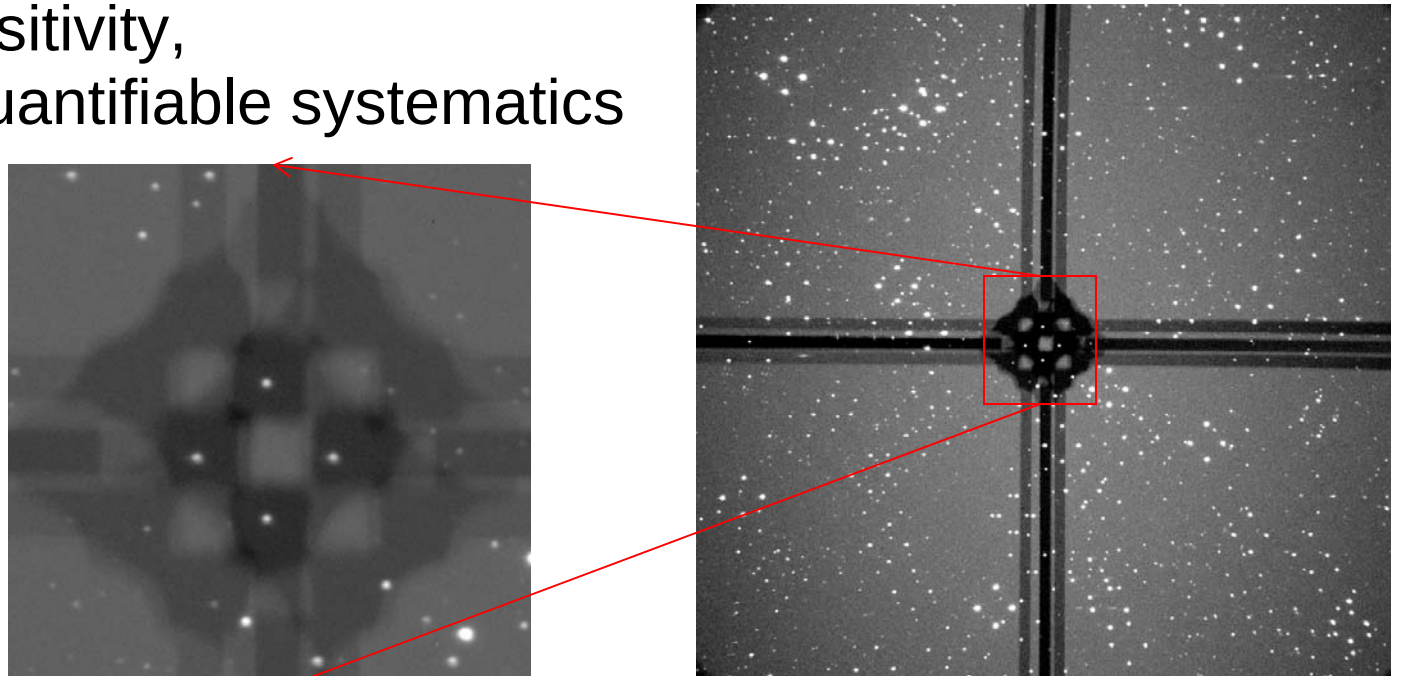
The all-out approach: ***do everything better***

- ✓ **Best instrument**
- ✓ **Best sample**
- ✓ **Best cadence / most observing time**
- ✓ **Best observing strategy**
- ✓ **Best collection of simultaneous broadband data**

robopol Blazar Optopolarimetr

The all-out approach: ***do everything better***

- ✓ **Best instrument**
  - designed and built at IUCAA specifically for Skinakas 1.3m
  - innovative design 4-channel polarimeter + mask, 13'x13' FOV
  - maximize sensitivity,
    minimize unquantifiable systematics



The all-out approach: ***do everything better***

- ✓ **Best sample**
  - Large (>100), objectively selected sample of γ-ray—loud blazars
  - control sample of γ-ray—quiet blazars
  - other interesting sources

The brute force approach: ***do everything better***

- ✓ **Best cadence / most observing time**
  - ~1M$ in telescope time
  - 4 nights/week during Skinakas observing season (8 months) for 3 years
  - ~ observe once every 4 days in quiescence

The all-out approach: ***do everything better***

- ✓ **Best observing strategy**
  - Observe flaring/PA rotating sources more frequently
  - Self-triggering ➔unbiased rotation events statistics

Robotic operation and dynamical scheduling

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The all-out approach: ***do everything better***

✓ **Best collection of simultaneous broadband data**

- in-collaboration:

  radio (OVRO – F-GAMMA - Torun)
  flux + polarization, multi-frequency

  optical (RoboPol)
  flux + polarization, multi-frequency

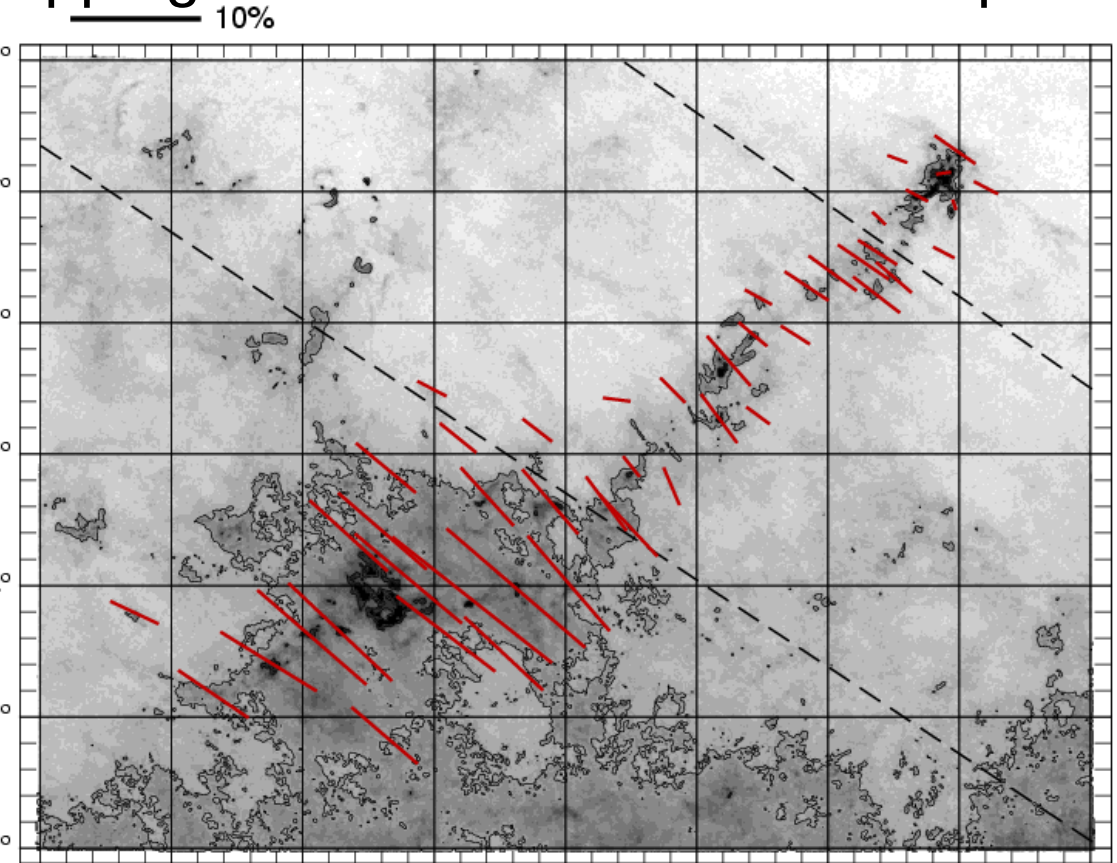
- publicly available:
  gamma (Fermi)

(Other science)

lot of other science is possible using the RoboPol instrument.

Principle Galactic science project

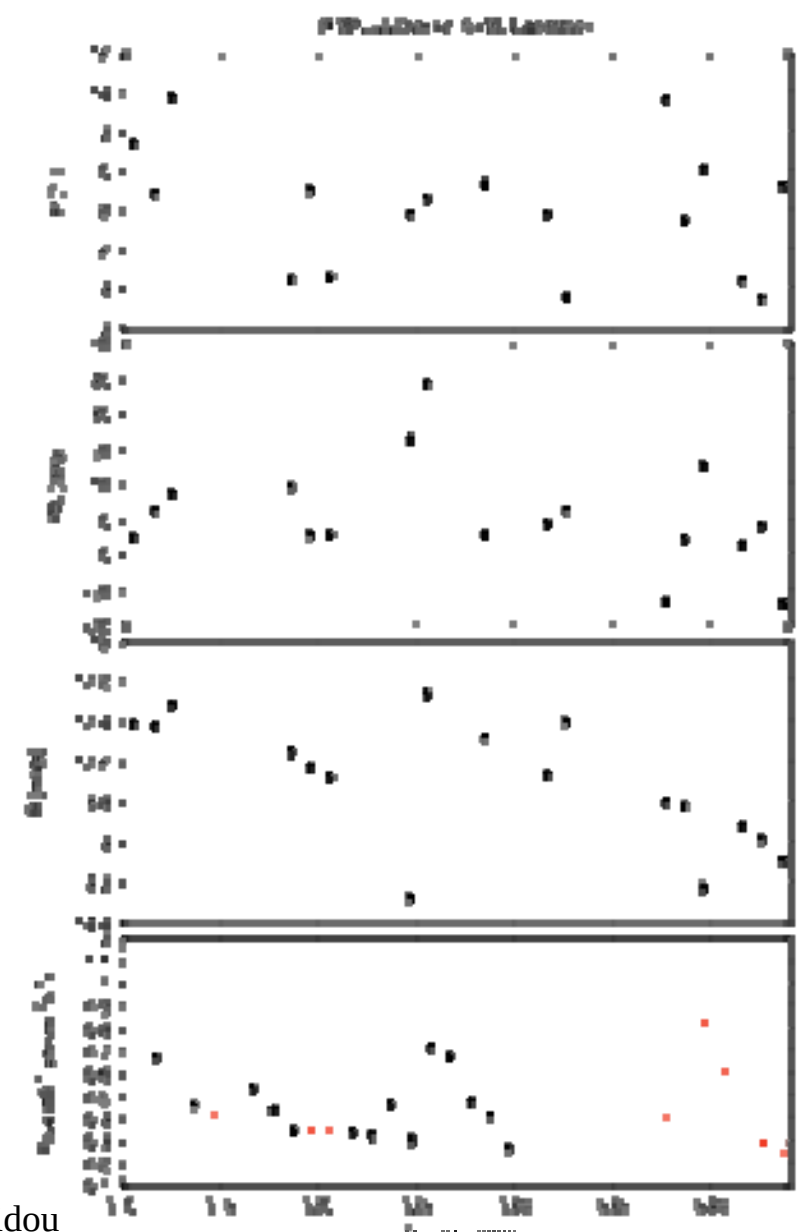
lapping B-field in ISM cloud envelopes

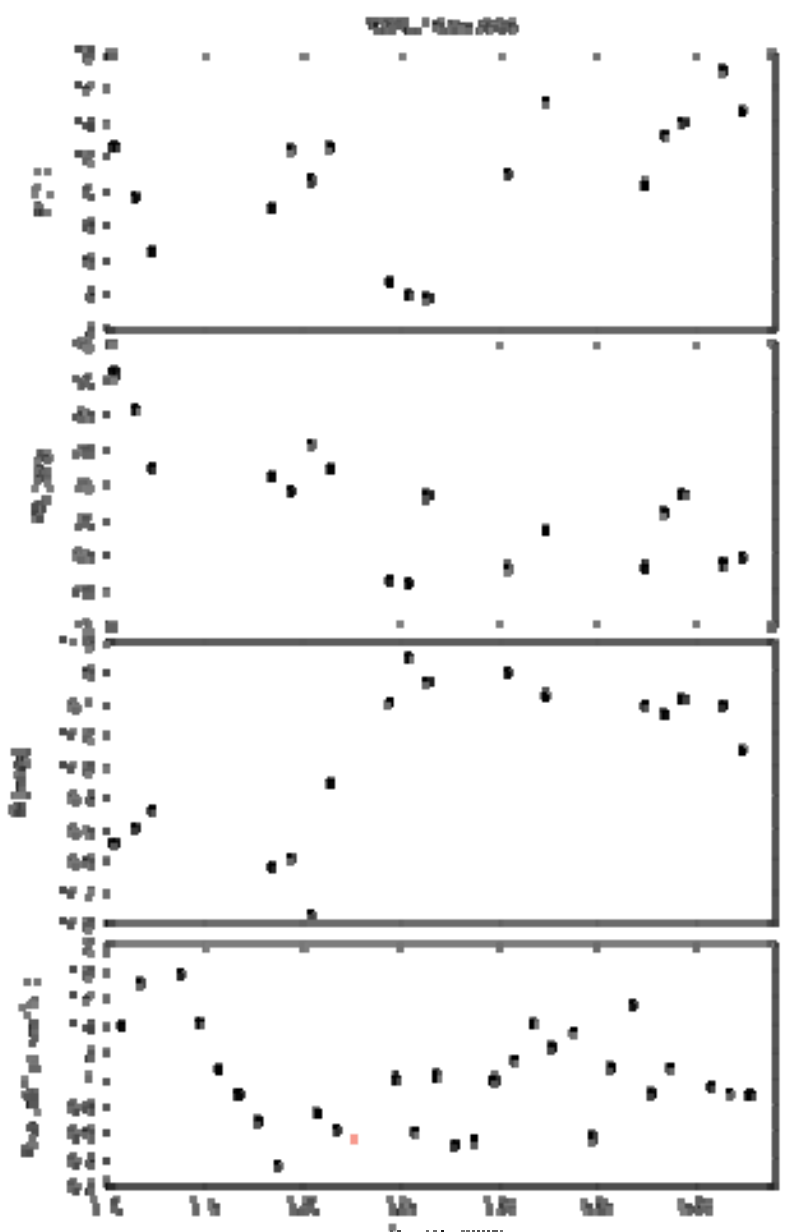


Also: X-ray binaries, transients followup polarization standards ...

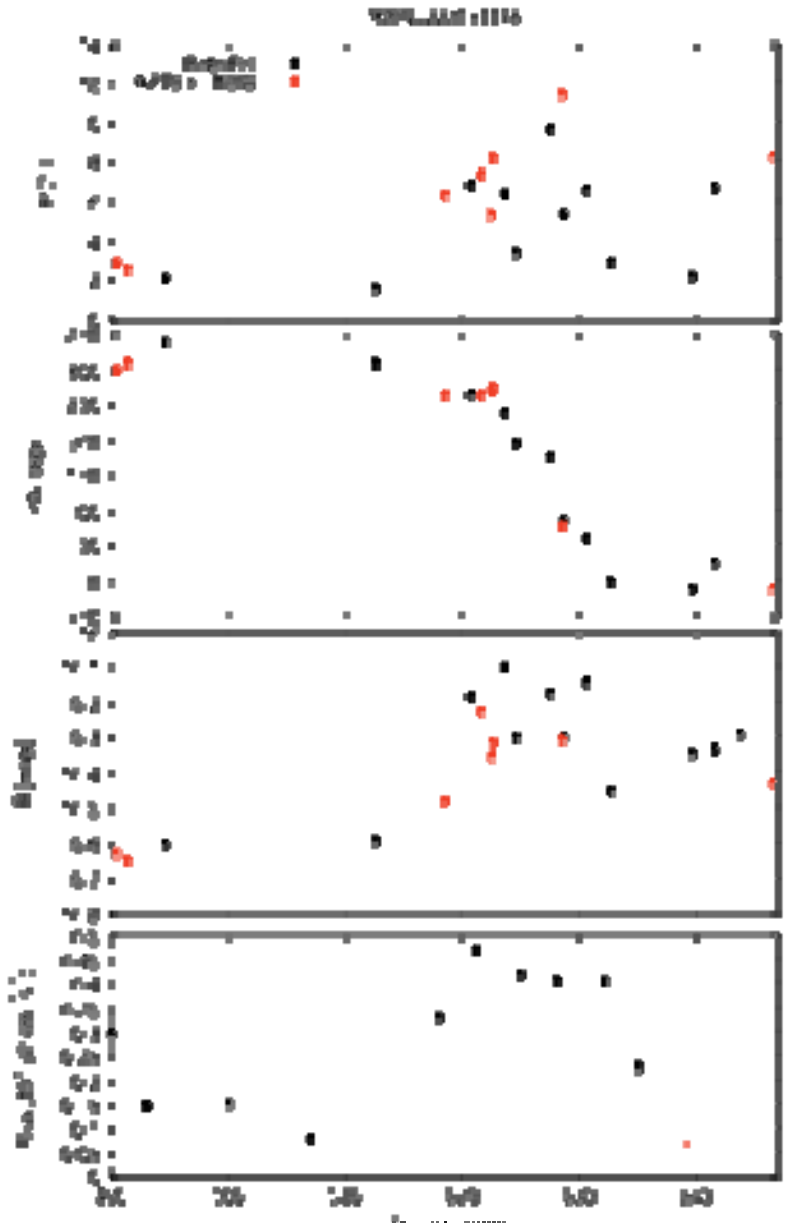
Alvez et al. 2008

Results!





Results!



Summary

RoboPol is a unique polarimetric program currently underway at the Skinakas Observatory in Crete

Already producing a valuable and unprecedented data set characterizing the optical linear polarization behavior of blazars.

The combination of polarization monitoring with multi-wavelength data gives us a powerful new view of the relativistic jets in blazars.

Powerful science is still possible with a small telescope.

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