

CTA-Pol — polarimetry for CTA-Oz

Nick Tothill for CTA-Pol

CTA-Pol: Jeremy Bailey, Daniel Cotton, Ain De Horta, Darren Maybour, Miroslav Filipovic, Gavin Rowell, NFHT

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Polarimetry for CTA – Why?

Polarimetry can access non-thermal emission that is usually associated with high-energy processes.

Blazars have highly polarised optical emission due to large amount of synchrotron.

Change in polarisation angle is associated with flaring.

Polarimetry for CTA – Why?

The CTA AGN KSP will monitor some AGN, but not all.

For the rest, we need other (non-CTA) monitoring to generate alerts.

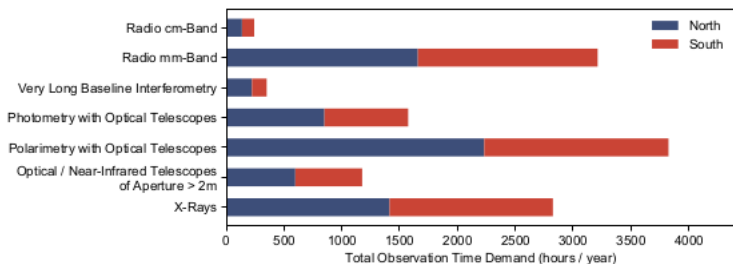
Programme of blazar monitoring for as many sources as possible with polarimetry (and maybe other stuff).

As usual, the southern hemisphere is underserved!

(N hemisphere is full of small telescopes available for monitoring, eg RoboPol in Crete; Liverpool Telescope in Canaries.)

Plan to site a 1m-class optical telescope with polarimetry on CTA-South site.

More will be needed, and greater time coverage helps.



3800 h/year = 1.3 FTE

CTA-Oz Needs Polarimetry!

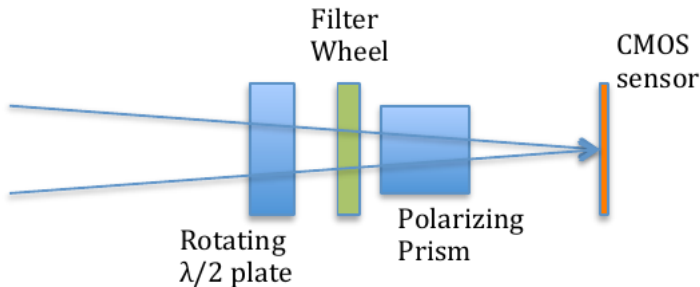
(According to our LIEF grant...)

- Australia has comparatively few technological strengths in CTA areas
- Southern Hemisphere MWL is an area of real strength
- Polarimetry is a niche capability, but a strong one

Polarimetry for CTA – How?

Construct a polarimeter in the line of HIPPI – mini-HIPPI – HIPPI-2 – PICSARR (Jeremy Bailey and Daniel Cotton)

These polarimeters are fast-rotating, high-precision polarimeters for bright stellar targets.



Use high-speed detectors (PMTs, modern sCMOS)

Polarimetry for CTA – How?

CTA-Pol:

- Needs to work with fainter sources
- Does not need the same level of precision
 - 1 Blazars are *way* more polarised than stars
 - 2 The polarisation shifts we're looking for are large
- needs to be able to work on a variety of telescopes
 - 1 we don't have a dedicated telescope
 - 2 but there are underused telescopes lying around Oz
 - 3 (and maybe other locations)

Polarimetry for CTA – Where?

- WSU 0.6m
 - 1 great for testing, commissioning
 - 2 hard to do the full programme
- ANU 2.3m
 - 1 currently doesn't work (for us)
 - 2 could be made to work
 - 3 high potential, but technical and financial challenges
- AAT 3.6m
 - 1 known to work
 - 2 overkill
 - 3 resource-intensive
- other 1m class telescopes (Tas, WA, SSO)

Polarimetry for CTA – Who?

CTA-Oz has been funded to construct and commission CTA-Pol through the new LIEF grant.

Team:

- Jeremy Bailey – UNSW, WSU adjunct; fount of knowledge
- Daniel Cotton – ANU, MIRA (soon); consultant
- Ain De Horta – WSU; design, construction, commissioning, science
- Darren Maybour – WSU; design, construction, commissioning
- Miroslav Filipovic – WSU; science
- Gavin Rowell – Adelaide; Lead CI, science
- NFHT – WSU; Local CI, science, chief cook and bottle-washer
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