

Multiwavelength observations of Fermi-LAT monitored blazars with SMARTS

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Sources



LAT monitored blazars visible from CTIO (Chile) + other sources of interest (e.g. 0948+0022)

FSRQ

0208-512	0528+134
3C 273	3C 279
1406-076	1510-089
1622-297	1730-130
2155-304	3C 454.3

BL Lac

0235+164
OJ 287
2155-304

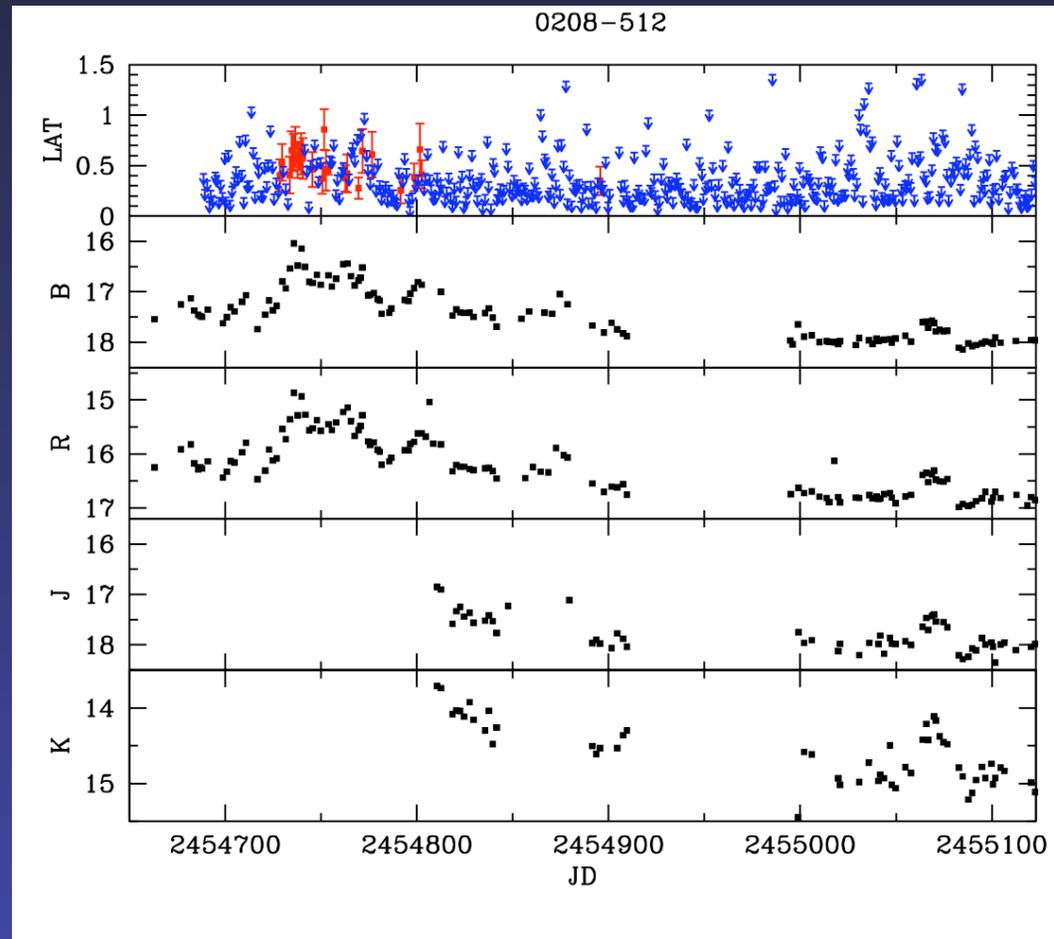
Optical/IR observations

- Bright blazars observed near-daily with the Small and Moderate Aperture Telescope System (SMARTS) at Cerro Tololo, Chile
- SMARTS 1.3m + ANDICAM. Can obtain simultaneous data from 0.4 to 2.2 microns (BVRJK). Photometry taken with 1-3 day cadence.
- Spectra of brighter blazars taken about once per month.
- Data through 31 July 2009 released at

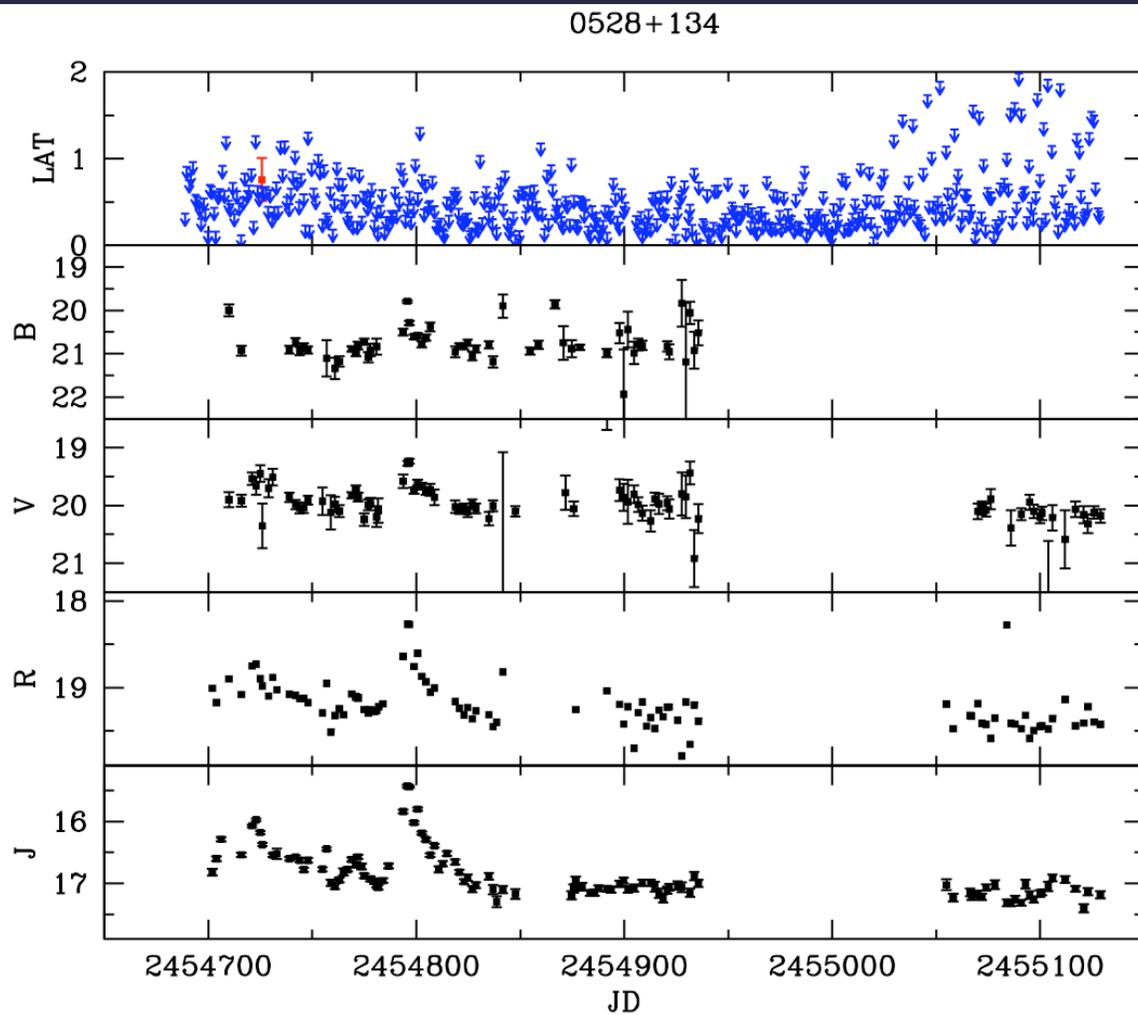
<http://www.astro.yale.edu/smarts/glast>



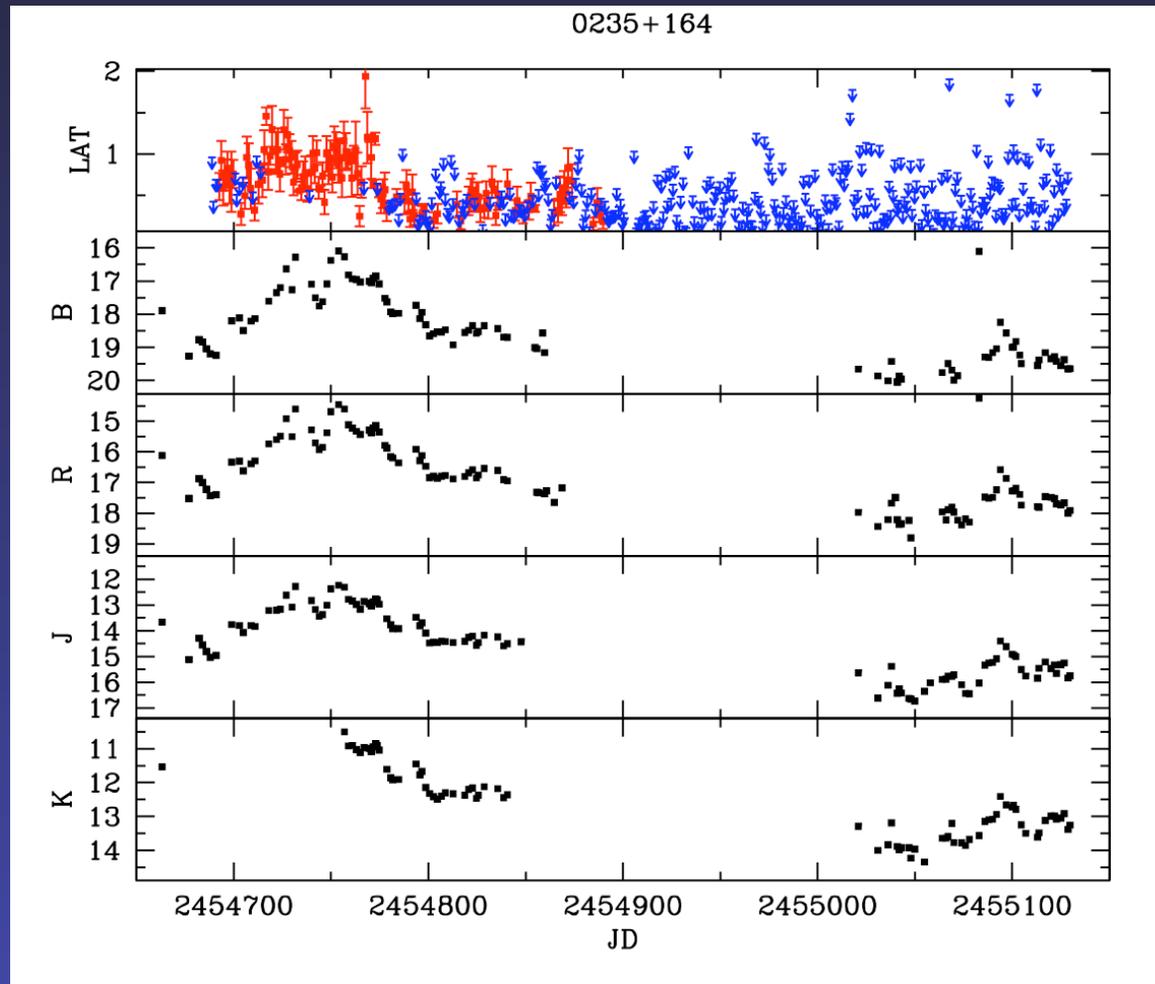
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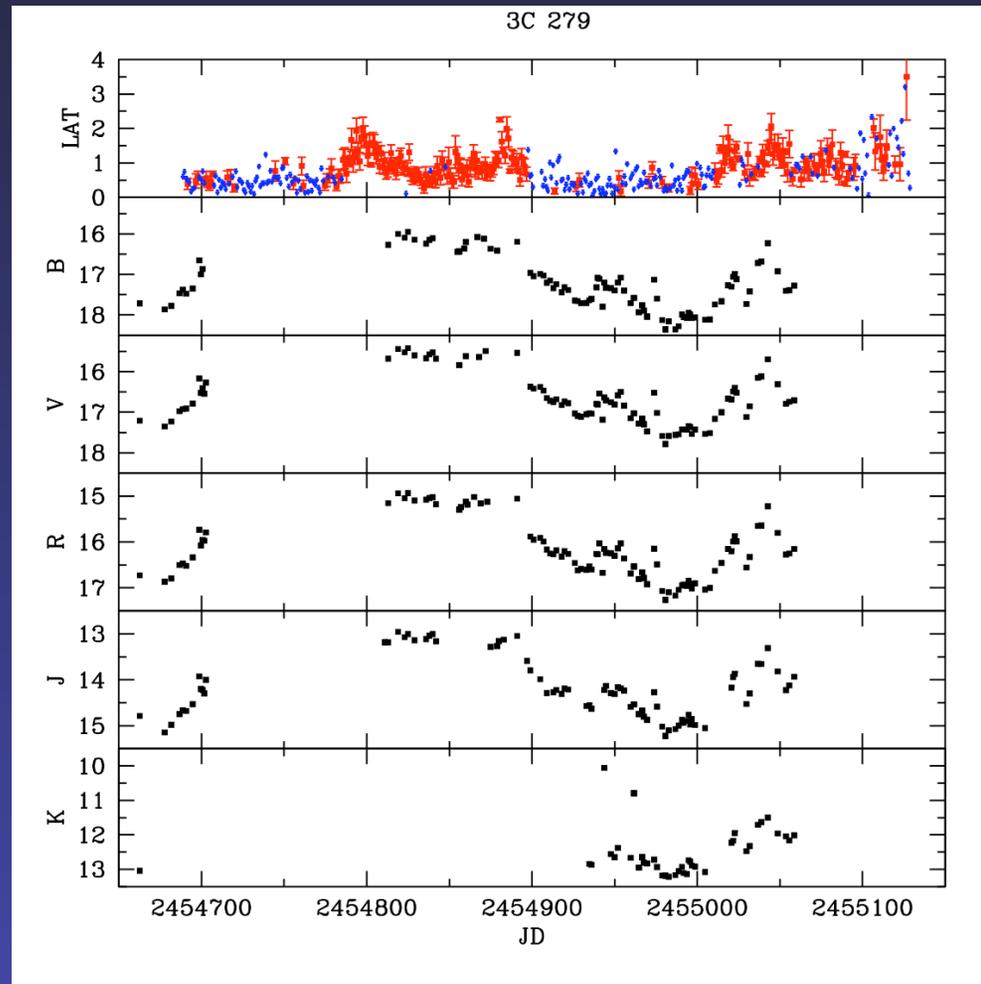
0528+134



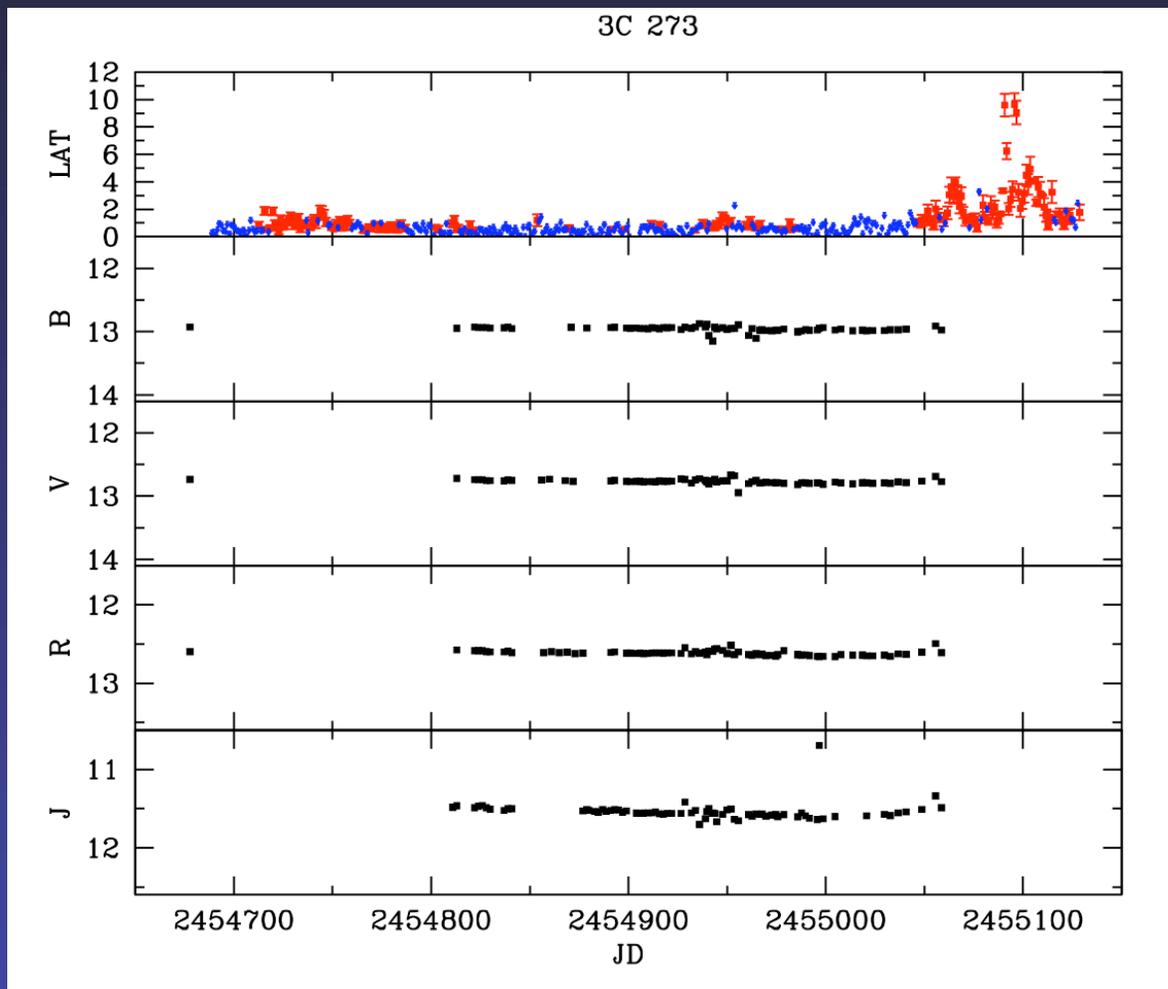
0235+164



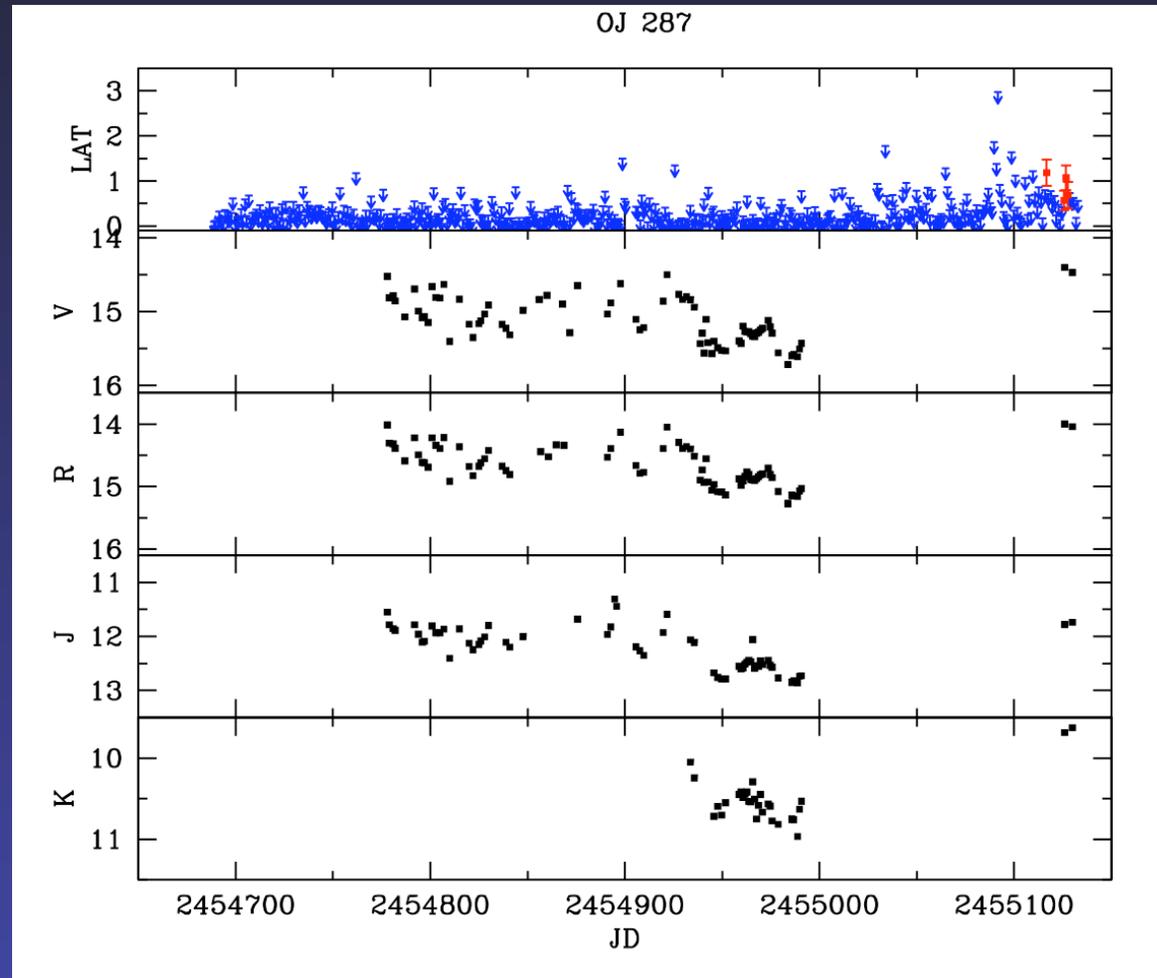
3C 279



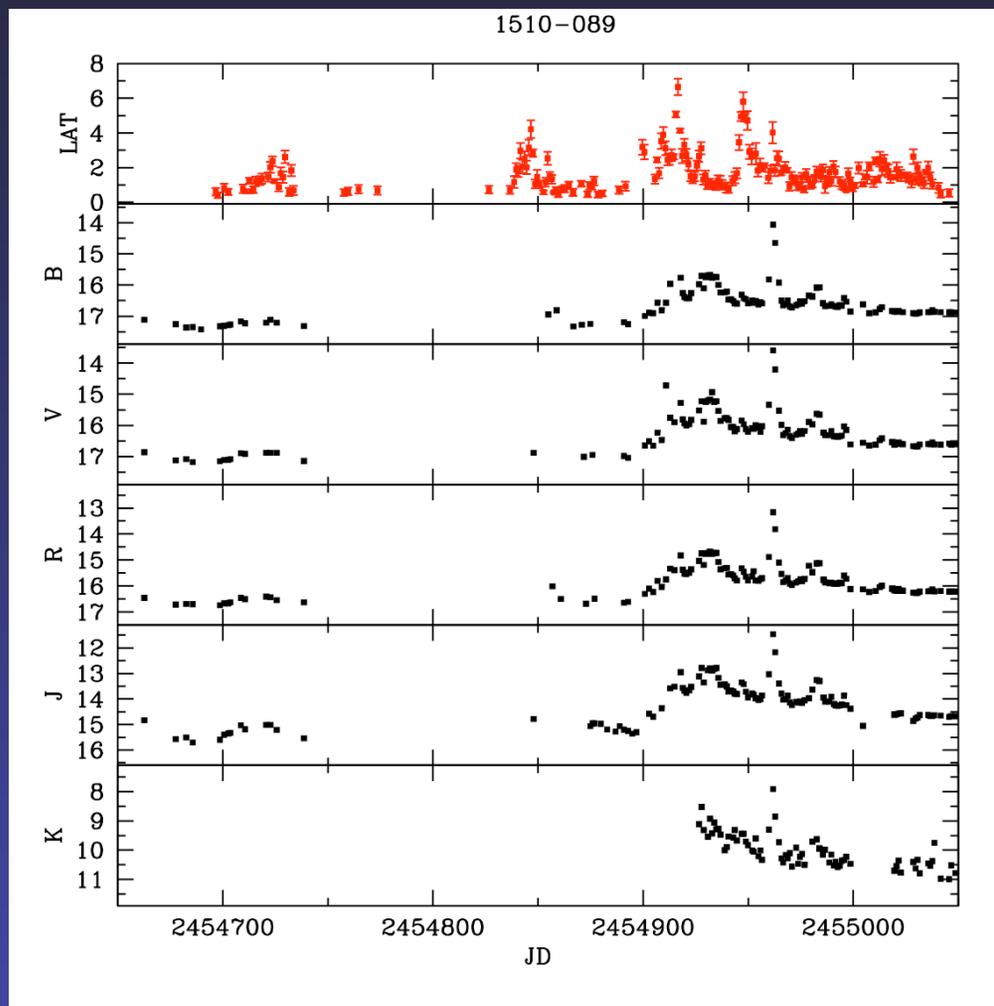
3C 273



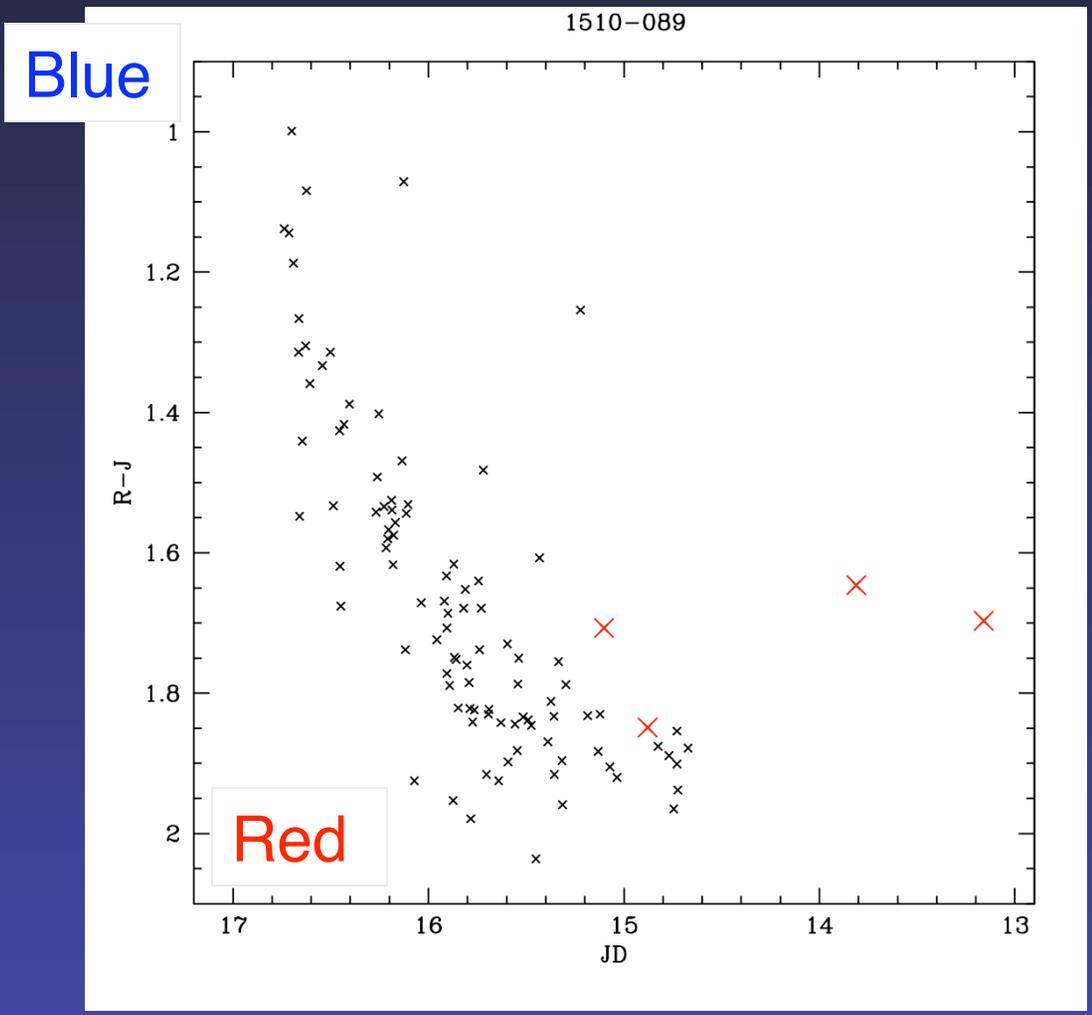
OJ 287



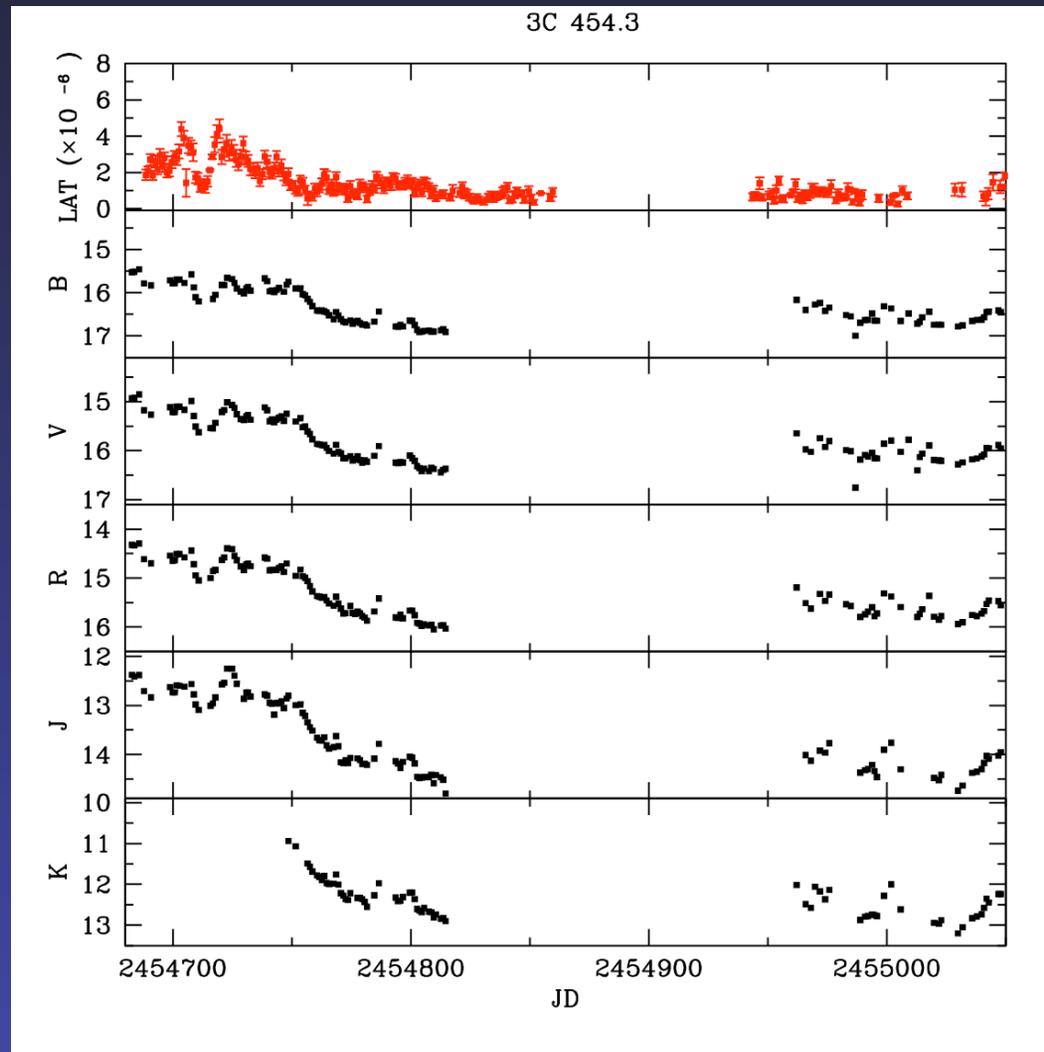
1510-089



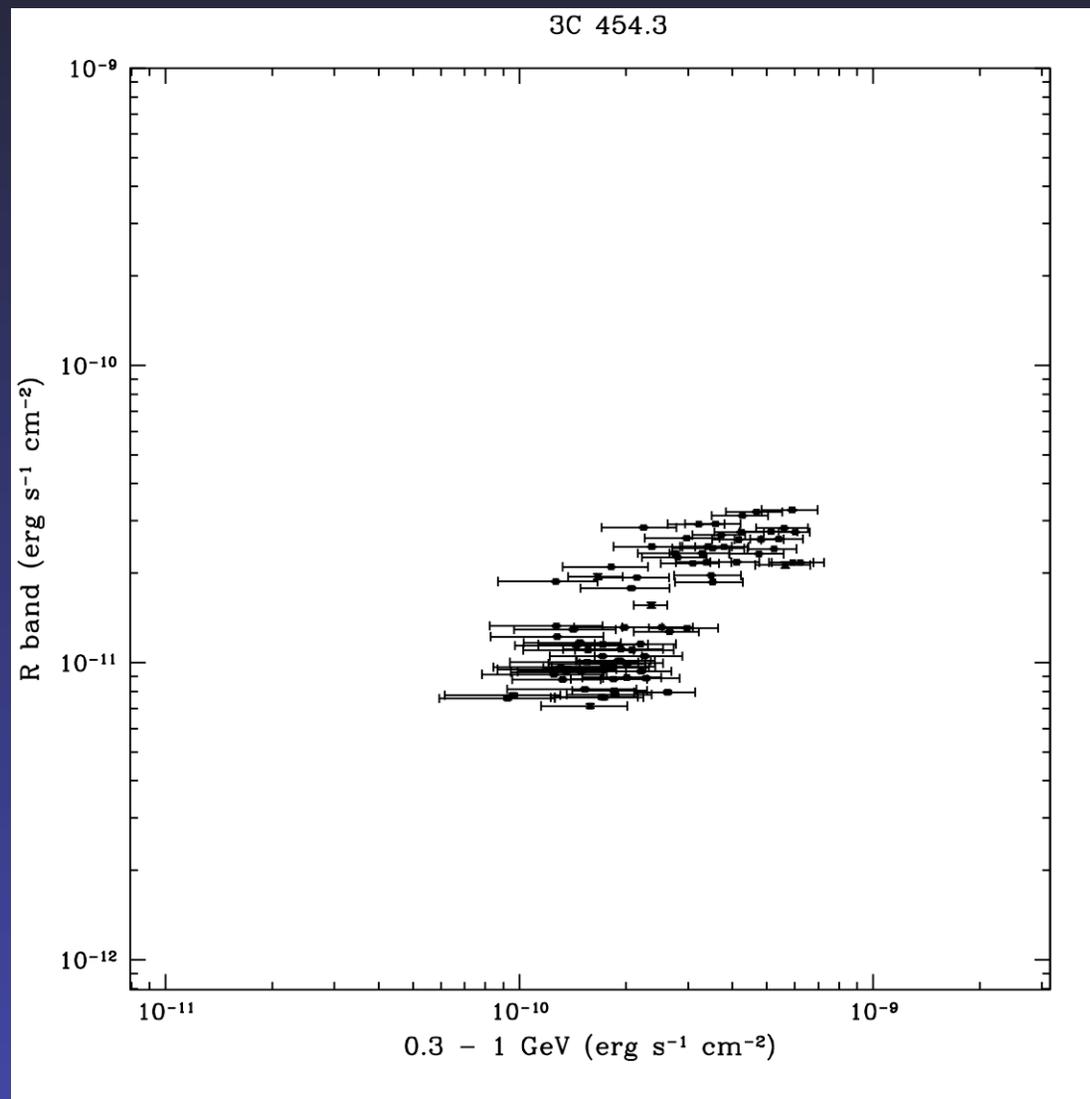
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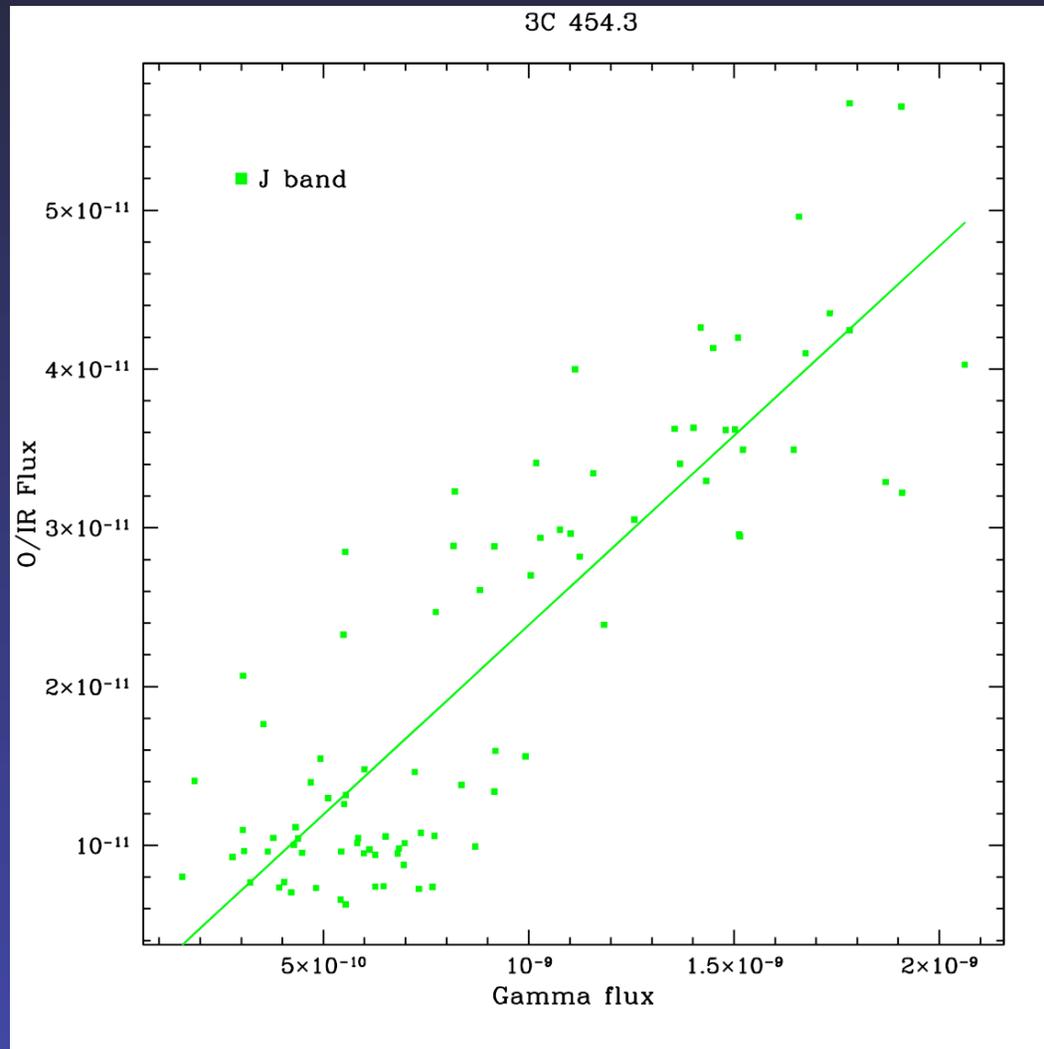
3C 454.3



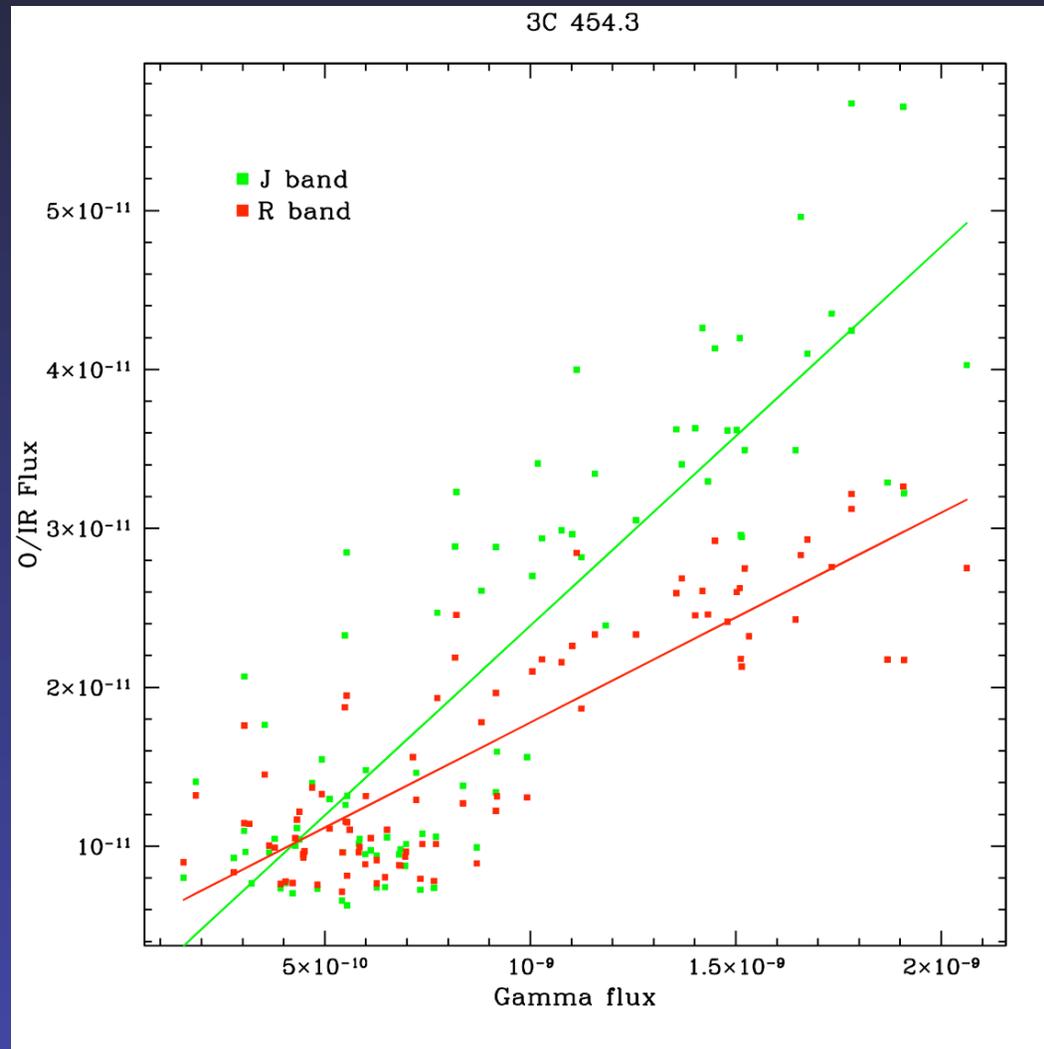
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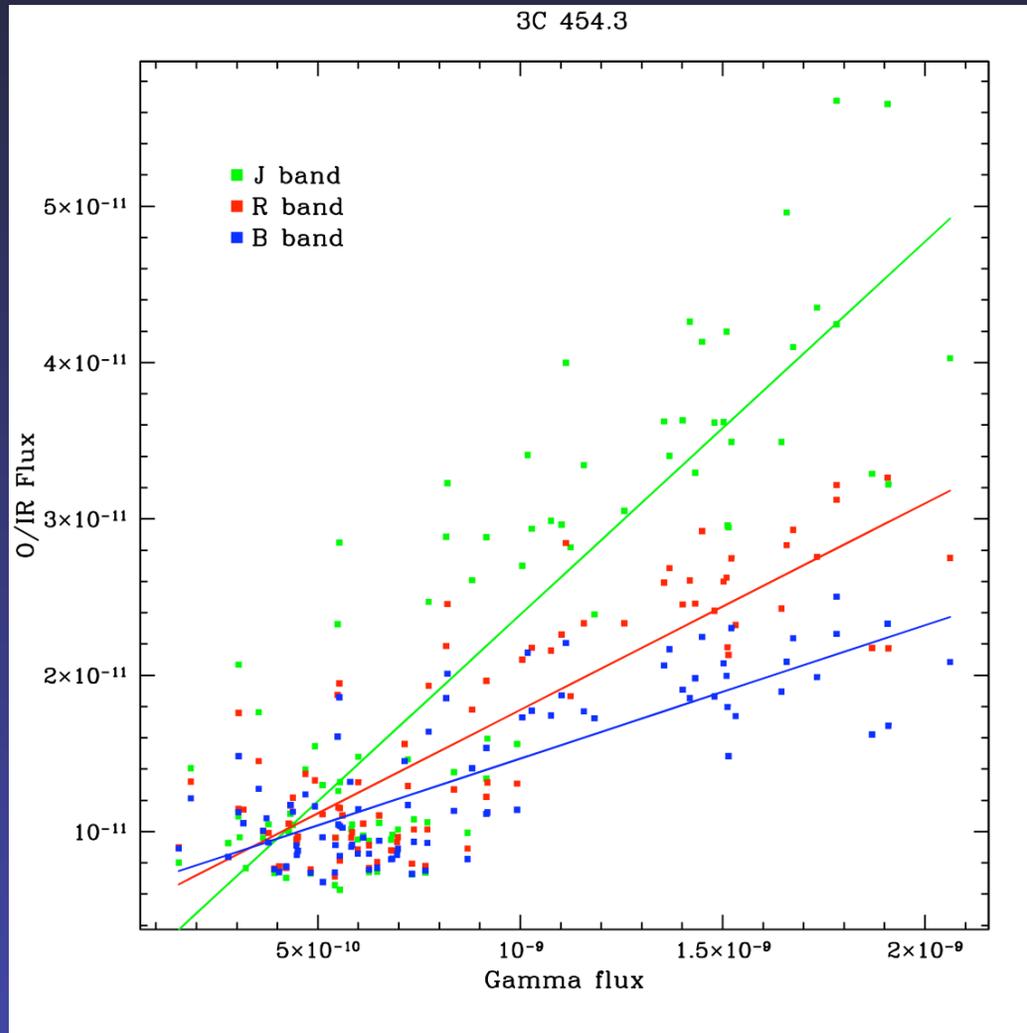
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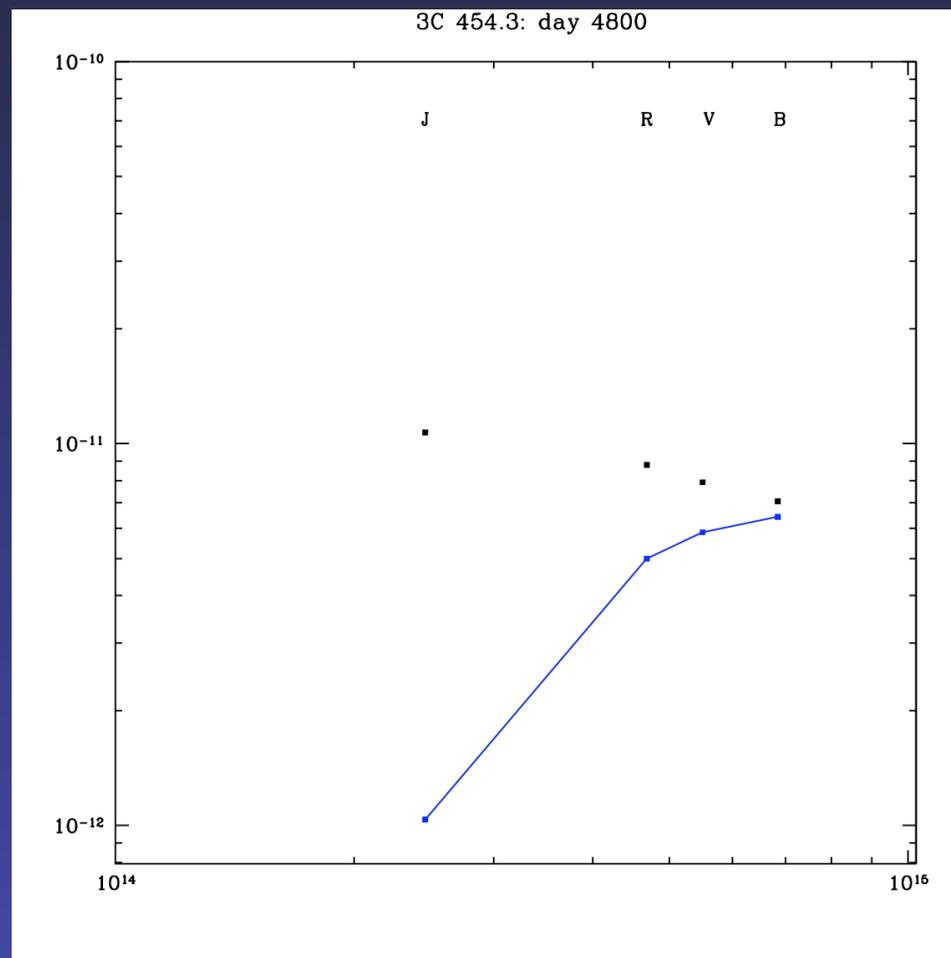
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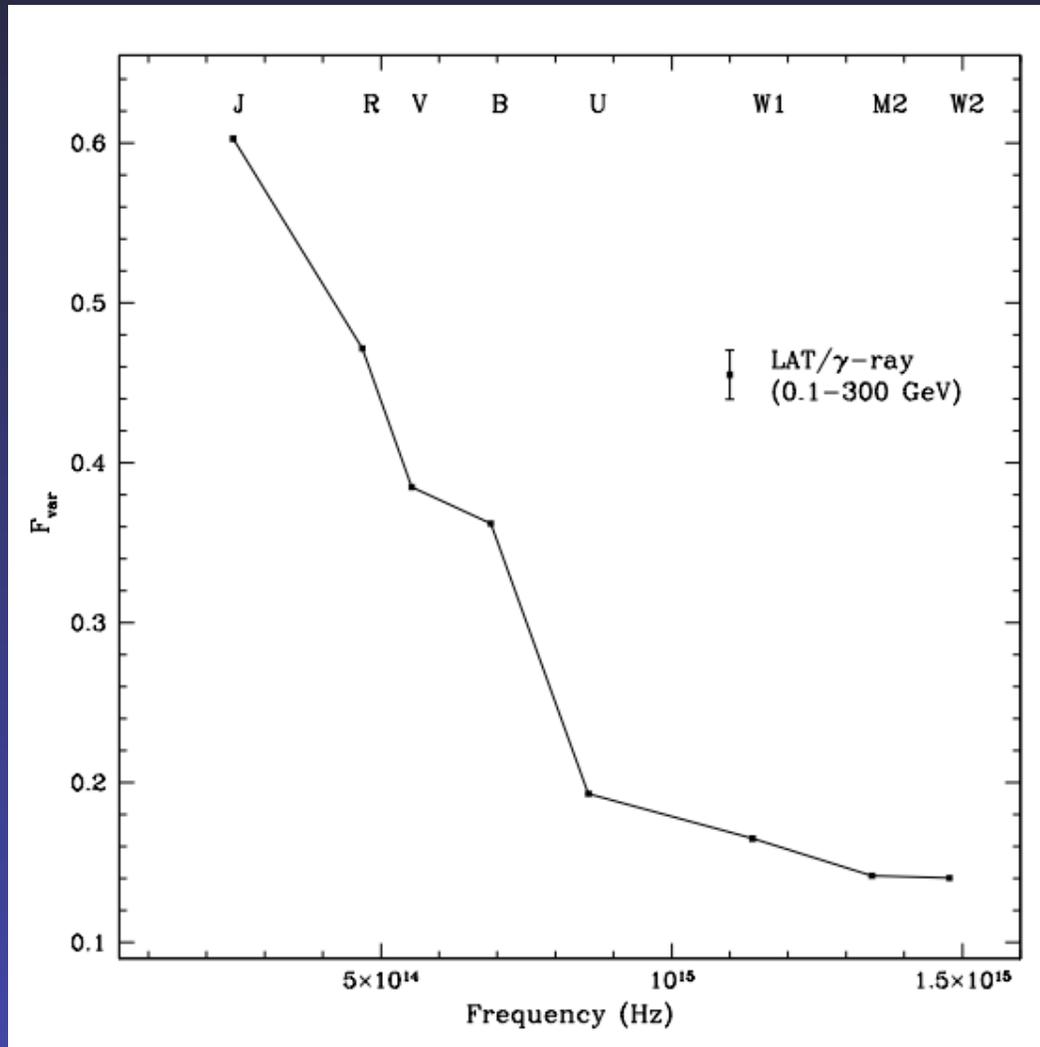
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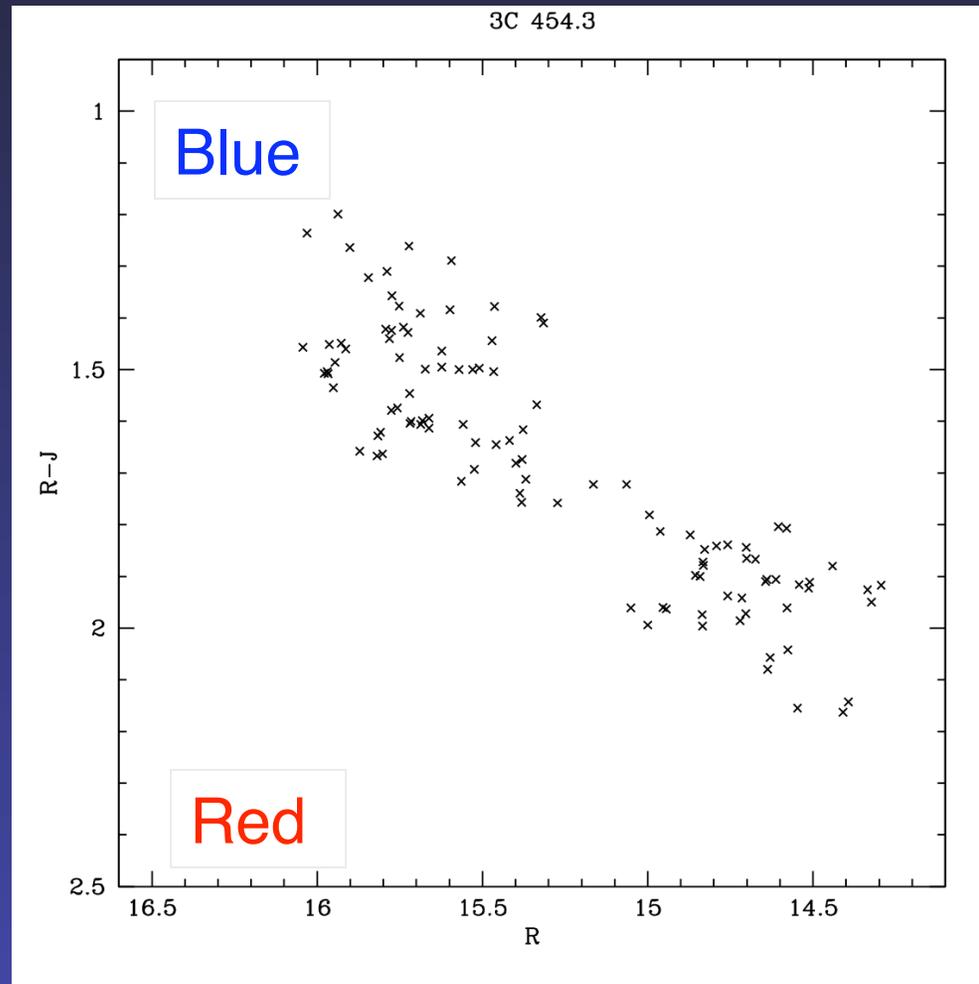
3C 454.3: underlying optical emission



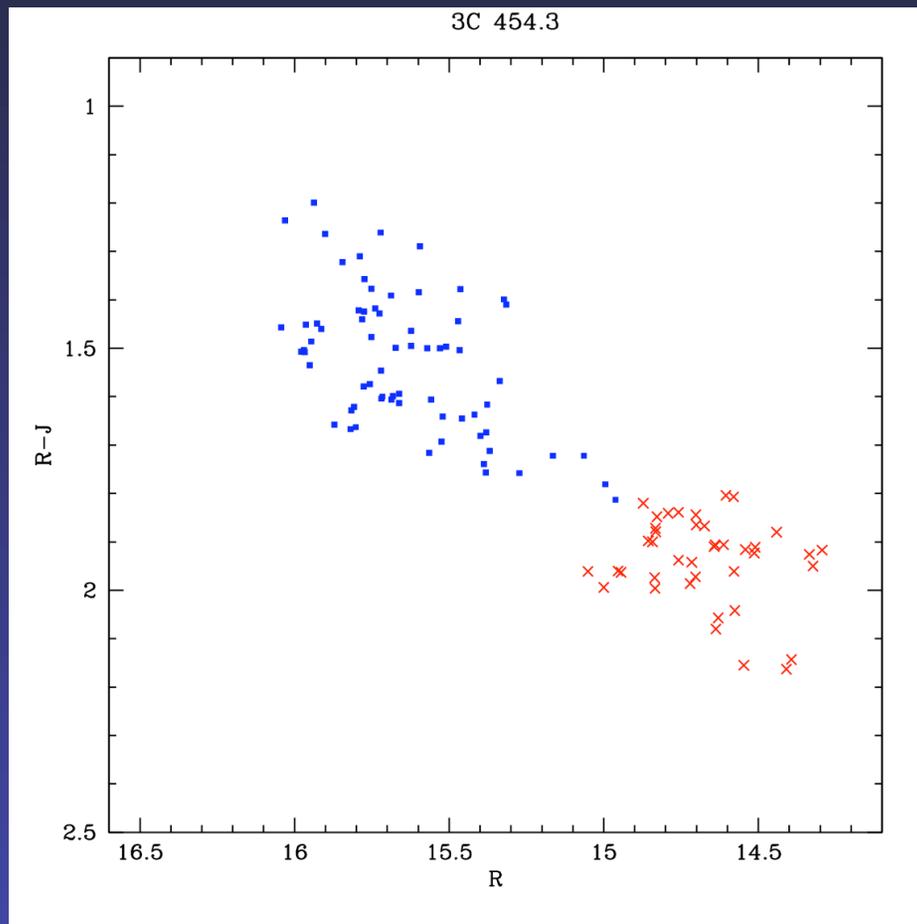
3C 454.3 Fractional variability amplitude



3C 454.3: color-magnitude

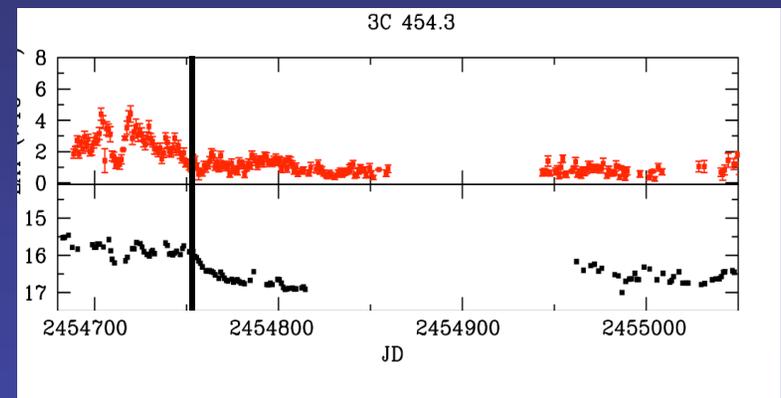


3C 454.3: color-magnitude

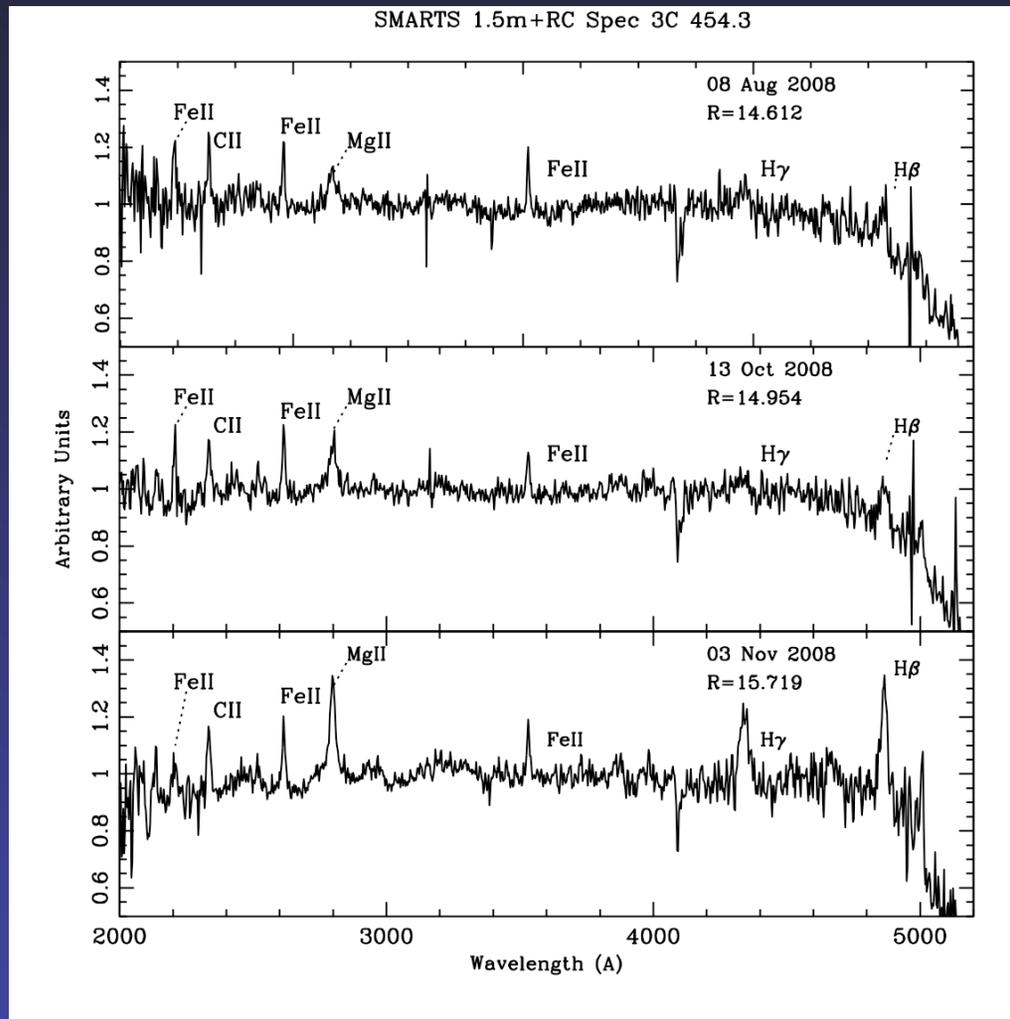


Blue

Red

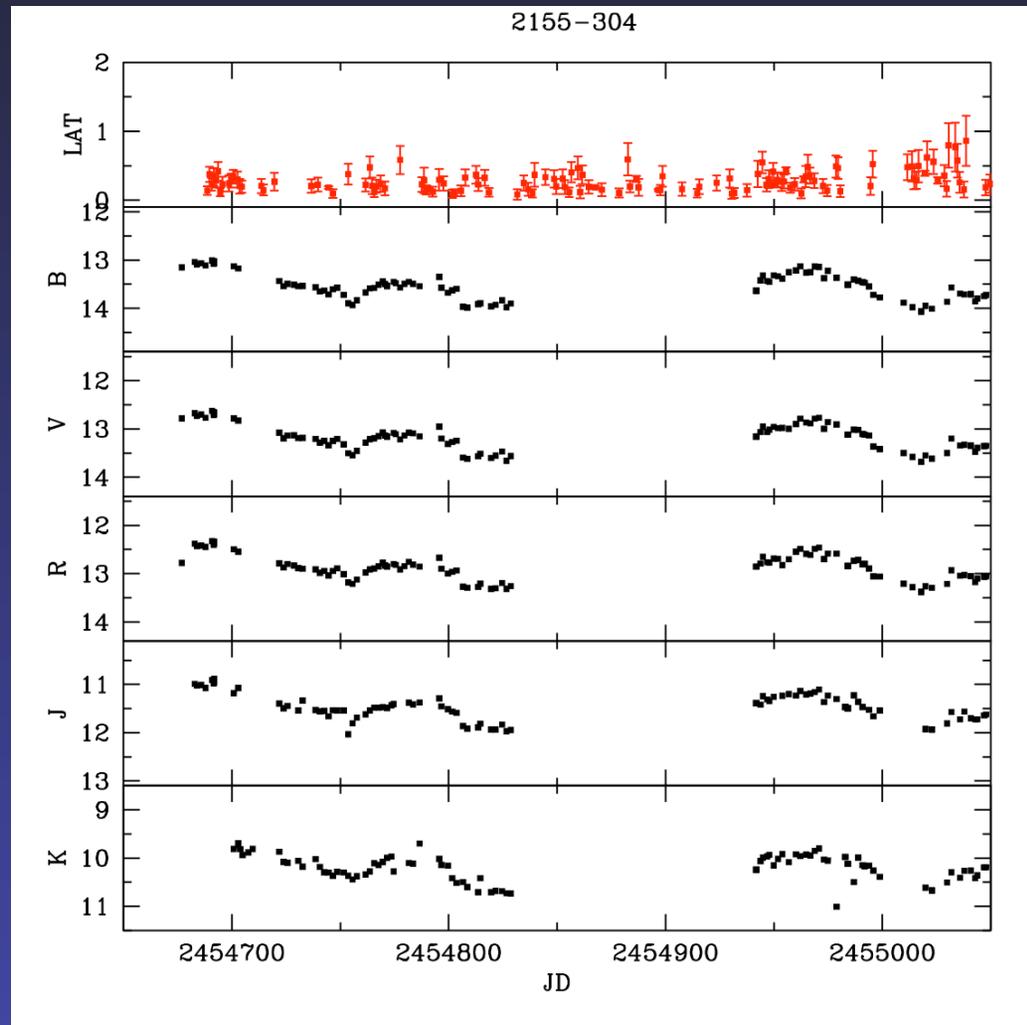


3C 454.3: Spectra

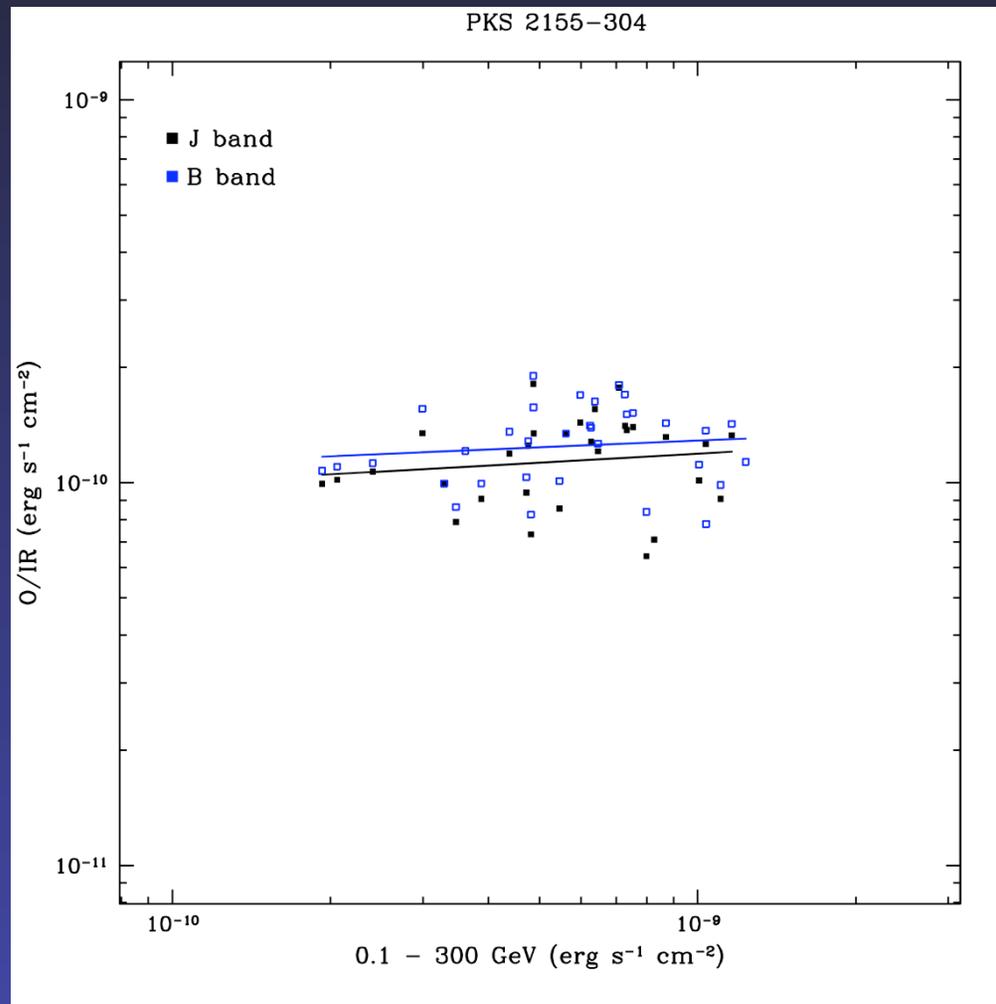


From J. Isler

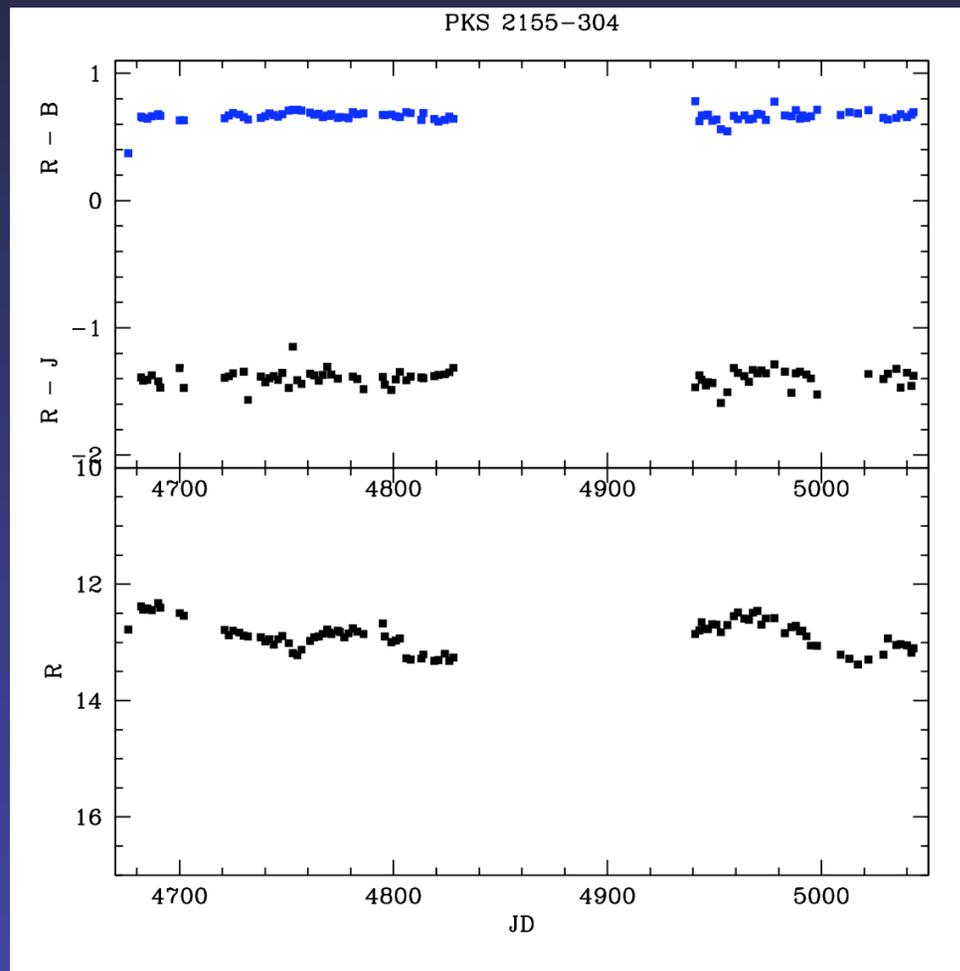
2155-304



2155-304



2155-304: colors v R-band



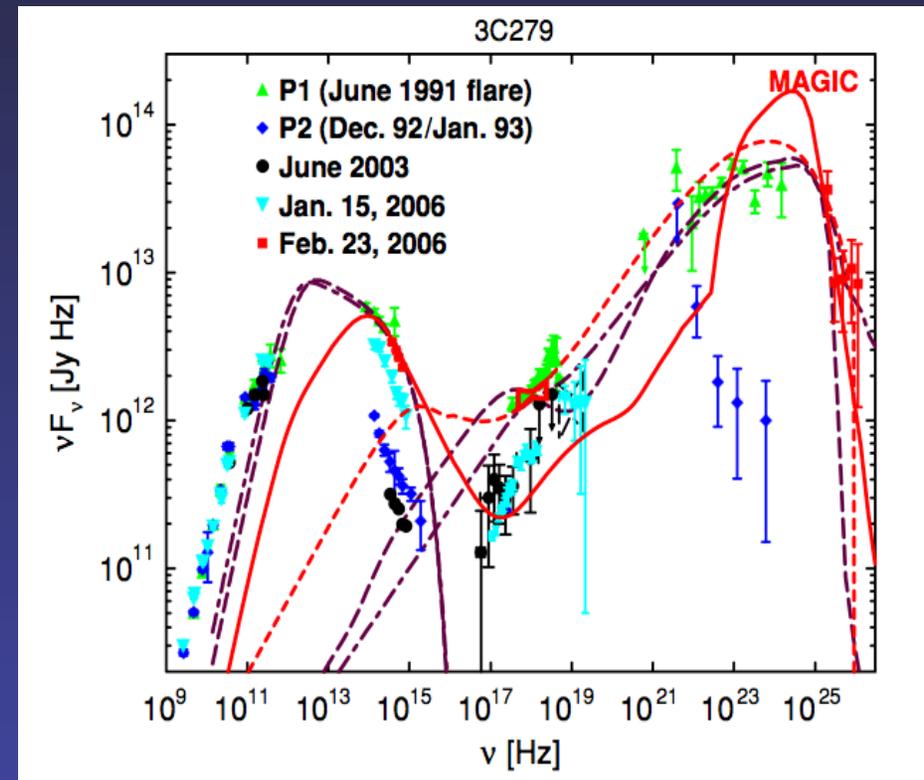
Future directions

- SMARTS monitoring of bright blazars is ongoing.
 - Favorite source? Let us know glast@panlists.yale.edu
- Can the time-dependent SED be modeled self-consistently?
- Do optical emission line properties correlate with jet power?
- Short v. long term variability studies

- How is jet powered?
- What particle populations?

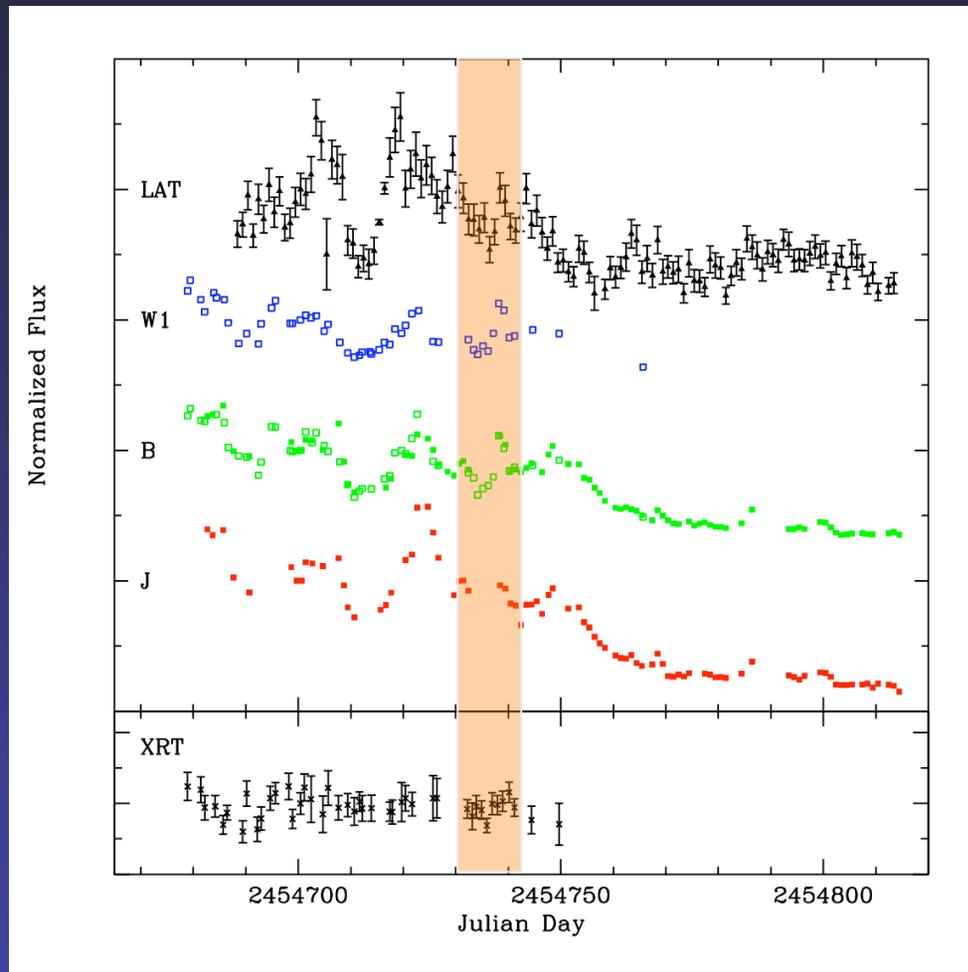
Challenges to SED modeling

- Single-epoch SED can be fit with leptonic or hadronic models.
- Variable sources require simultaneous data
- Broad-band SED measurements require multiple observatories
- Long term, simultaneous, multi-wavelength monitoring programs required



MW light curve

- NIR, Optical, UV, and Gamma-ray fluxes vary together with lag of less than one day.
- Variability amplitude in IR comparable to that in Gamma rays; decreases towards the UV
- Colors redder at higher fluxes.
- X-rays uncorrelated with other wavelengths.



Historical comparison

