

Quantification of the multi-frequency variability

David Paneque and Diego Tescaro

Update from presentation done on Meeting on April 23th

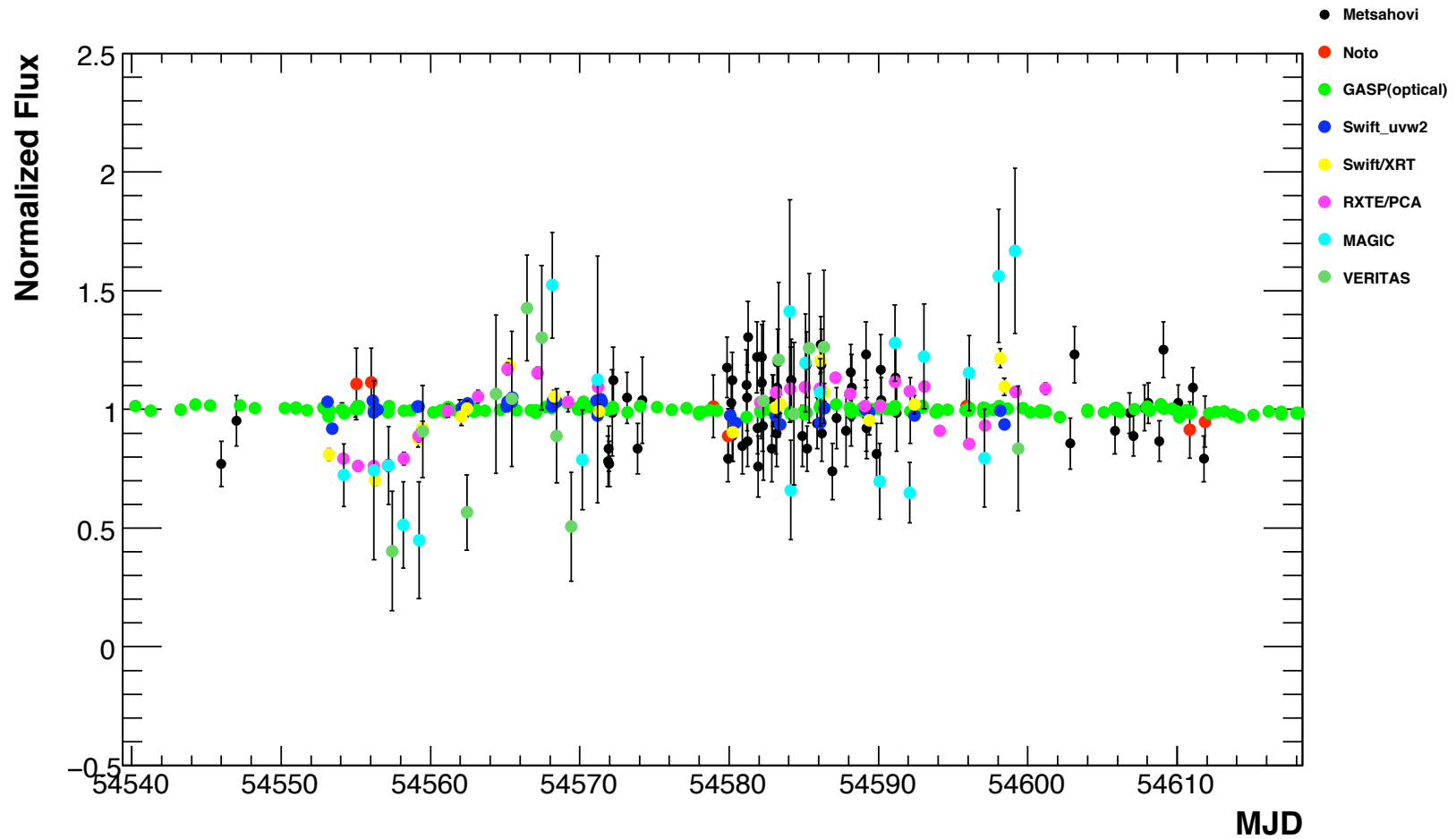
What's new:

RATAN-600 data (got this week)

Variability from GASP (KVA) data computed after subtracting host galaxy

Normalized Light Curves

Few instruments were removed



Measured fluxes at VHE were low (big relative errors)
In general No big flux variations (little variability)

Quantification of the Variability

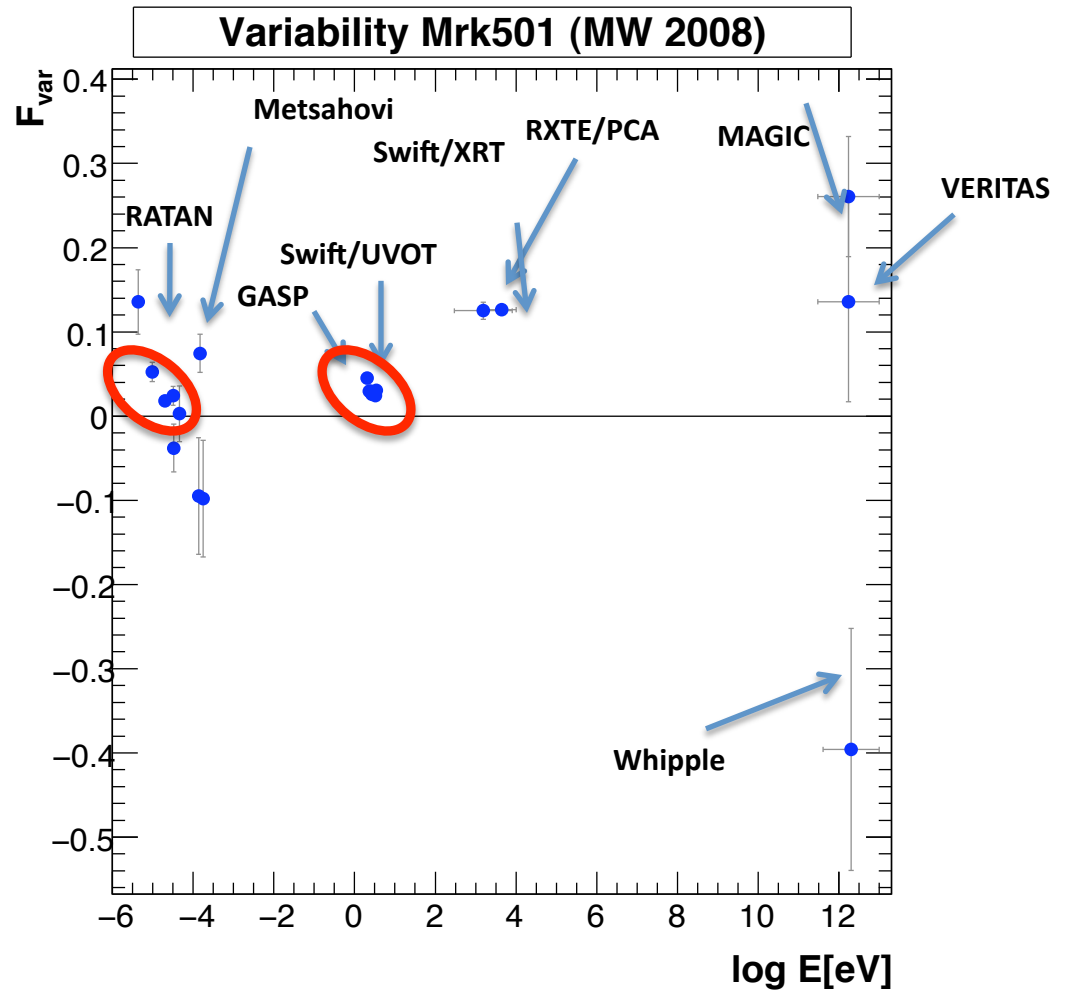
Quantification following prescription given in *Vaughan et al. 2003*

Journal-ref: Mon. Not. Roy. Astron. Soc. 345 (2003) 1271
 astro-ph/0307420 (July 2003)

$$F_{var} = \sqrt{\frac{S^2 - \langle \sigma_{err}^2 \rangle}{\langle F_\gamma \rangle^2}}$$

RATAN seems to show that variability decreases with energy (1 GHz, 2.3 GHz... → 11 GHz)
 Bug in data at 22 GHz

Is that real ?
How confident are we on flux values and errors ?



Quantification of the Variability

Quantification following prescription given in *Vaughan et al. 2003*

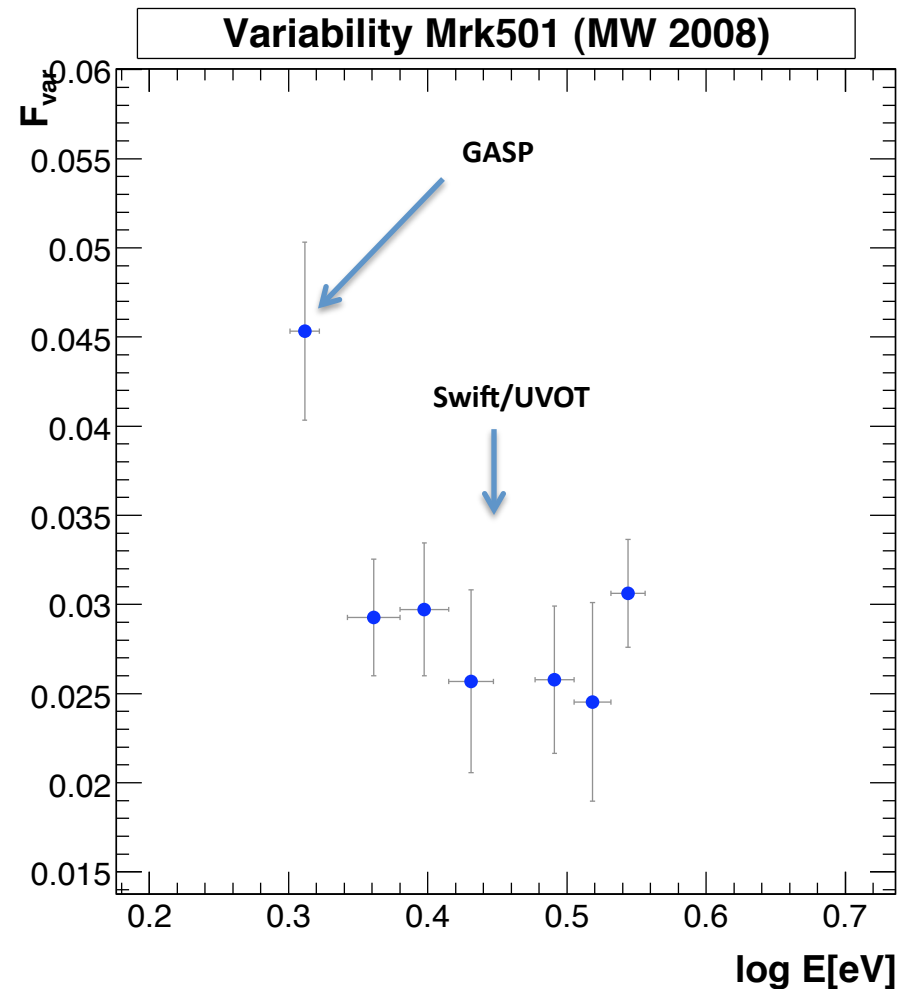
Journal-ref: Mon. Not. Roy. Astron. Soc. 345 (2003) 1271
astro-ph/0307420 (July 2003)

$$F_{var} = \sqrt{\frac{S^2 - \langle \sigma_{err}^2 \rangle}{\langle F_{\gamma} \rangle^2}}$$

GASP (KVA) was corrected for host galaxy (without propagating error of host galaxy) into individual values.

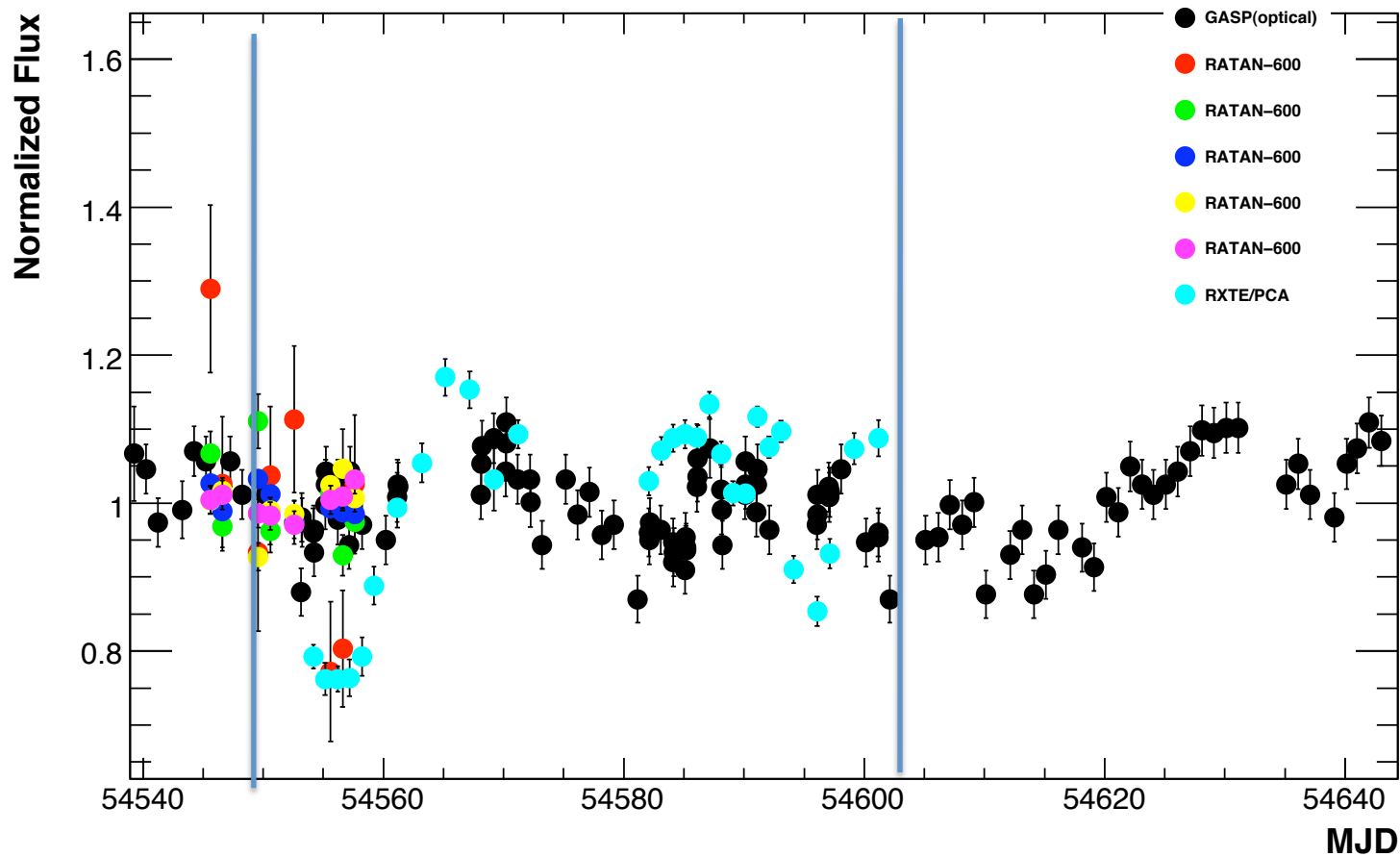
Same procedure with “host galaxy + error” and with “host galaxy – error”. Differences in F_{var} were small, comparable to statistical error. Added in quadrature.

GASP (KVA) somewhat larger variability value than that of Swift/UVOT



Optical and RATAN data extend below/above the period covered by most instruments (54550-54604).

In order to make a more fair comparison of multi-frequency variability, we should not use the “additional” data.



Outlook:

1 - Produce results with the optical and radio data limited to period 54550-5604

2 – Converge on discussions of “negative fractional variance”

Conceptually, we cannot talk about “negative variance” which would imply something that is less variable than constant.

On the other hand, we quote also an error, and thus it could have some useful meaning (like a negative measured flux)

Jeff and myself are discussing that since few days... but unluckily.. Because of agenda incompatibility we did not manage to meet...

3 – Possible overestimation in Whipple error bars (see also backup slide)

Once these 3 points are finalized, this topic should get closed/fixed.

Backup

