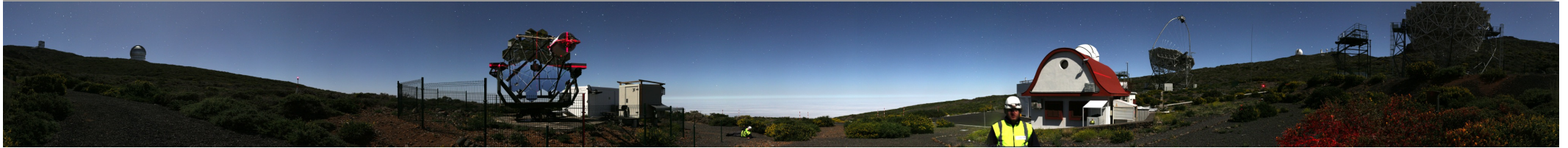


Blazar Studies with ASTROSAT

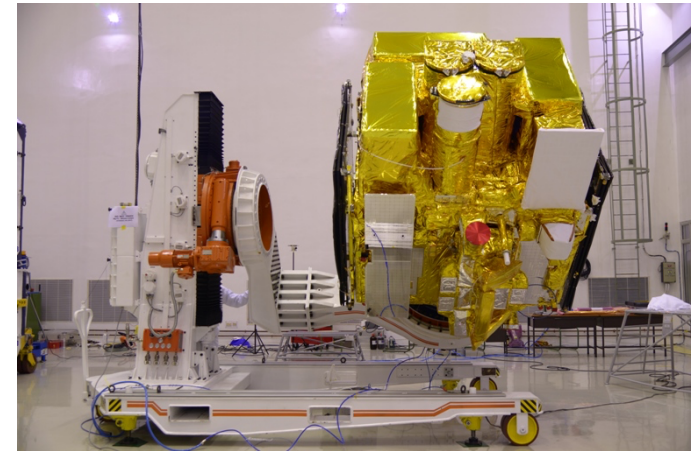


Amit Shukla



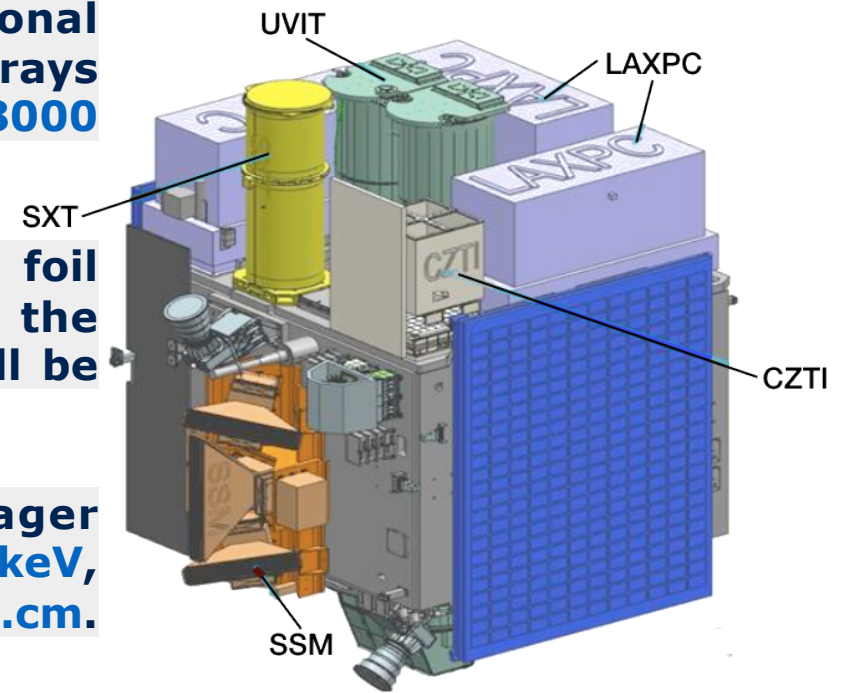
ASTROSAT

- ASTROSAT is first multi-wavelength astronomy mission from India.
- Orbit: A **650-km, near-equatorial orbit.**
- It was launched by the **Indian launch vehicle PSLV** from Satish Dhawan Space Centre, Sriharikota on **September 28, 2015.**
- The expected operating life time of the satellite will be **more than five years.**



ASTROSAT

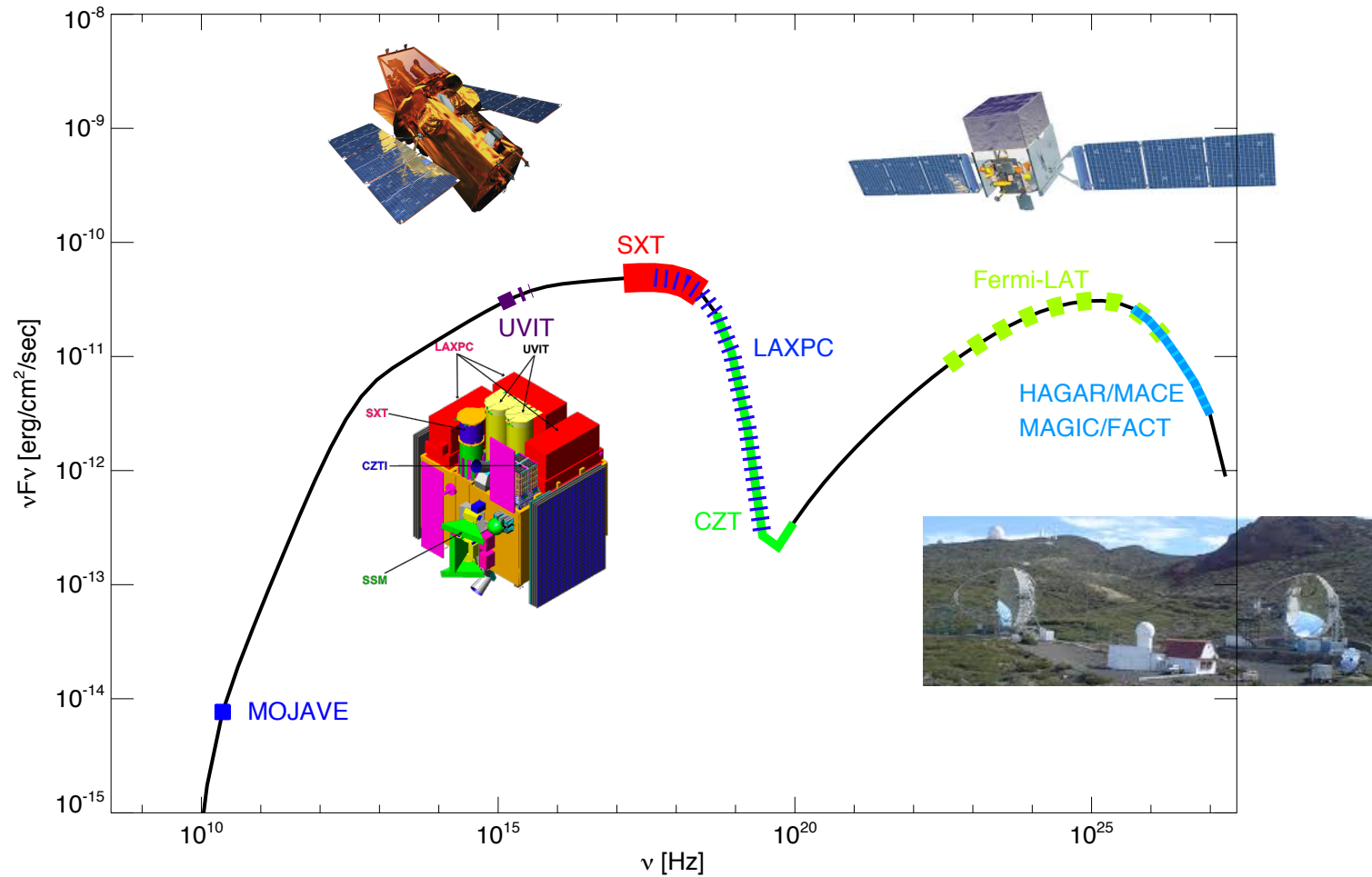
- **Twin 38-cm Ultraviolet Imaging Telescopes (UVIT)** covering Far-UV to optical bands.
- **Three units of Large Area Xenon Proportional Counters (LAXPC)** covering medium energy X-rays from **3 to 80 keV** with an effective area of **8000 sq.cm. at 10 keV**.
- **A Soft X-ray Telescope (SXT)** with conical foil mirrors and X-ray CCD detector, covering the energy range **0.3-8 keV**. The effective area will be about **120 sq.cm. at 1 keV**.
- **A Cadmium-Zinc-Telluride coded-mask imager (CZTI)**, covering hard X-rays from **10 to 150 keV**, with about 6 deg field of view and **480 sq.cm.** effective area
- **A Scanning Sky Monitor (SSM)** consisting of three one-dimensional position-sensitive proportional counters with coded masks. The assembly is placed on a rotating platform to scan the available sky once every six hours.



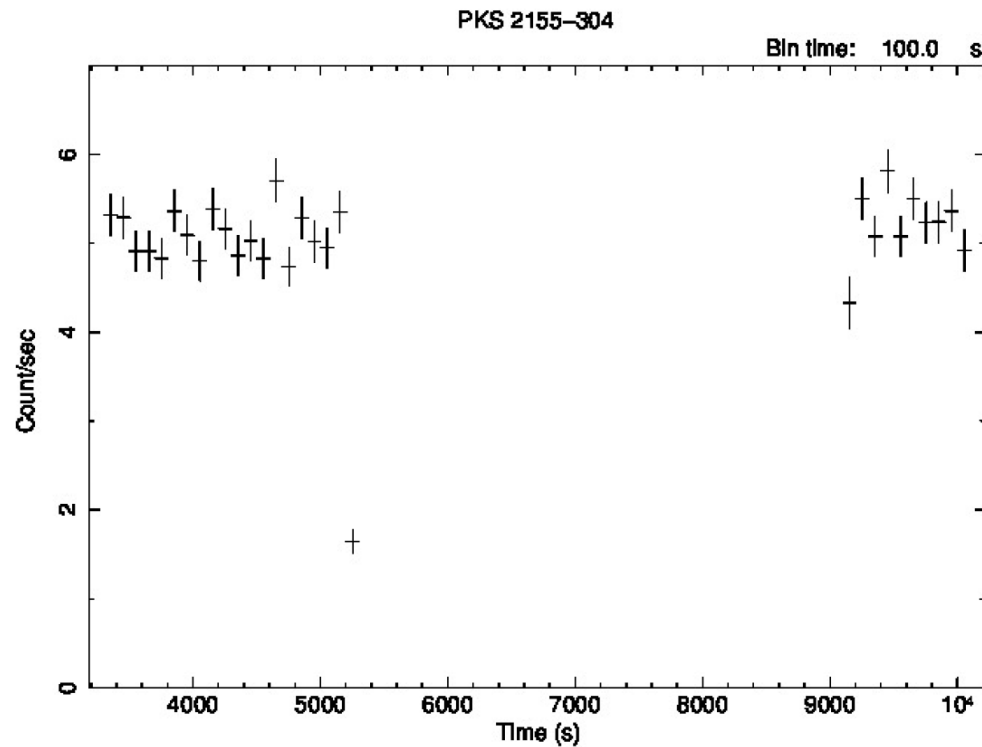
ASTROSAT : role in understanding of blazars

- **Dominant emission : Leptonic or Hadronic**
- **One Zone vs. Multi Zone emission from Blazars**
- **Particle acceleration in emission zones**
- **Origin of orphan flares (?)**
- **Detection of very hard spectrum. (?)**
- **Detection of hard spectrum from extreme blazars**

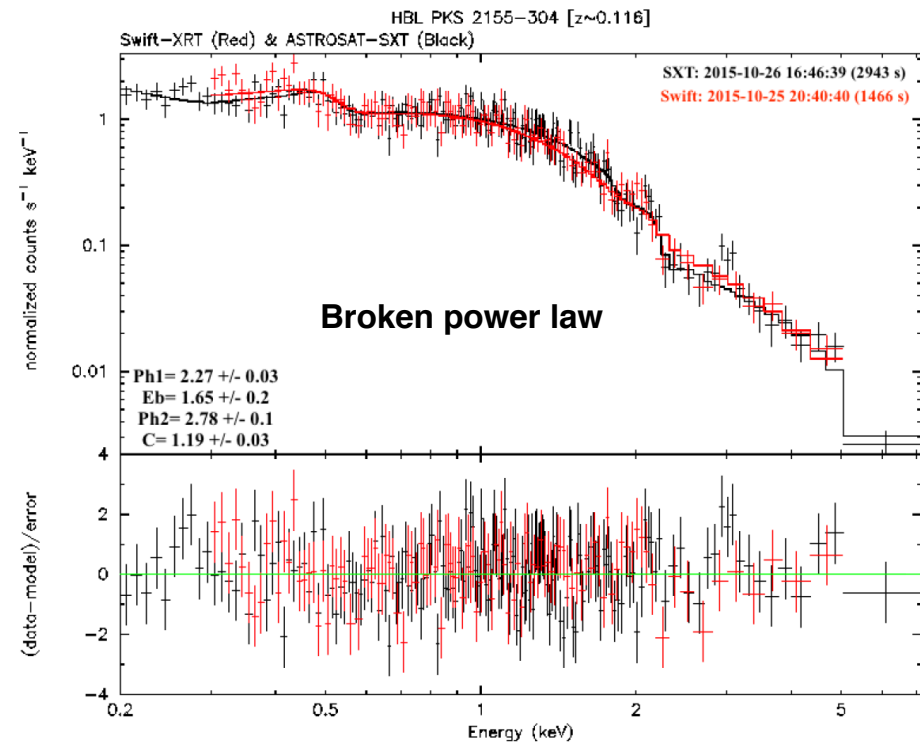
Multiwaveband SED



PKS 2155-304 with ASTROSAT



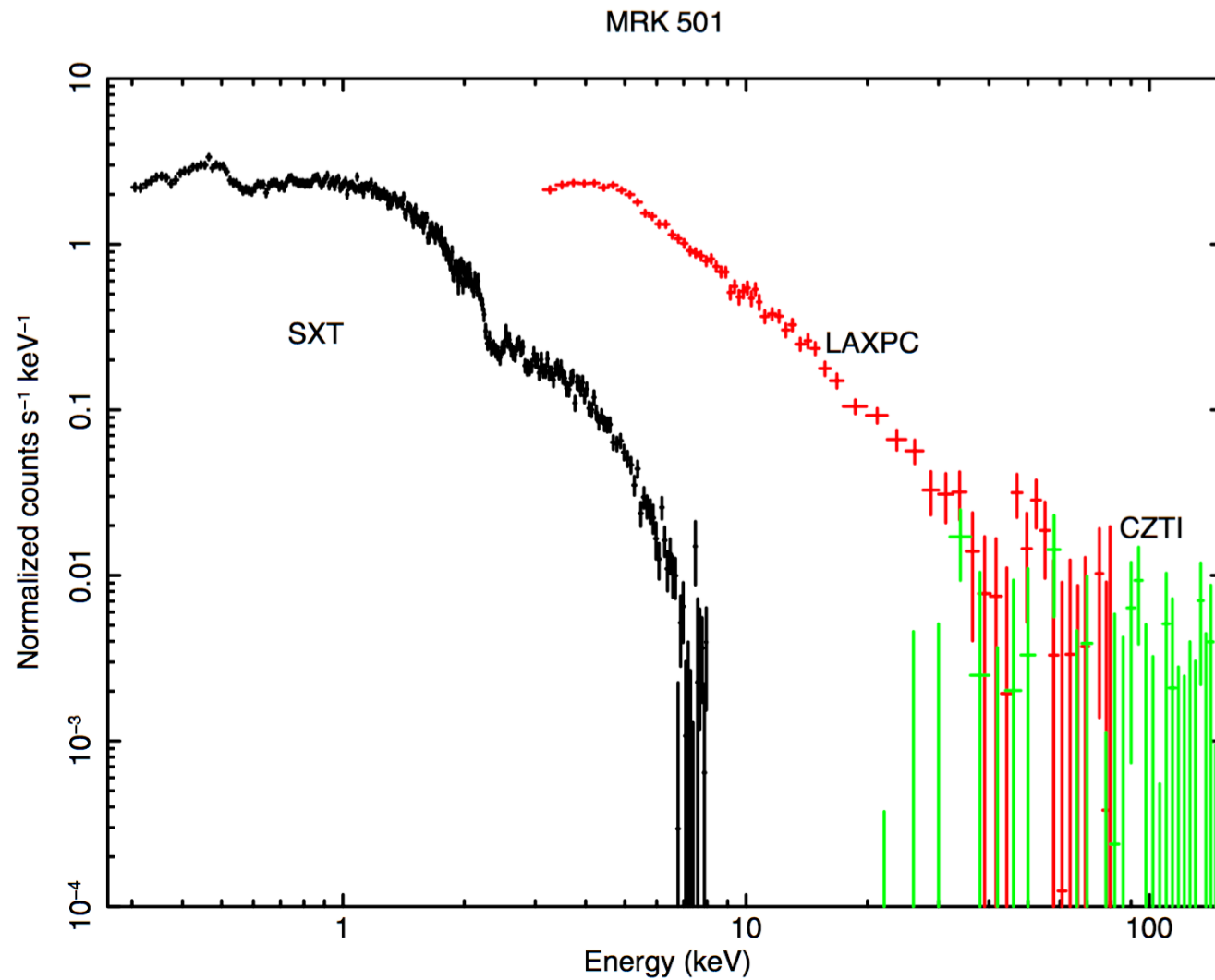
Start Time 17321 16:55:54:140 Stop Time 17321 18:47:34:140



26 Oct 2015

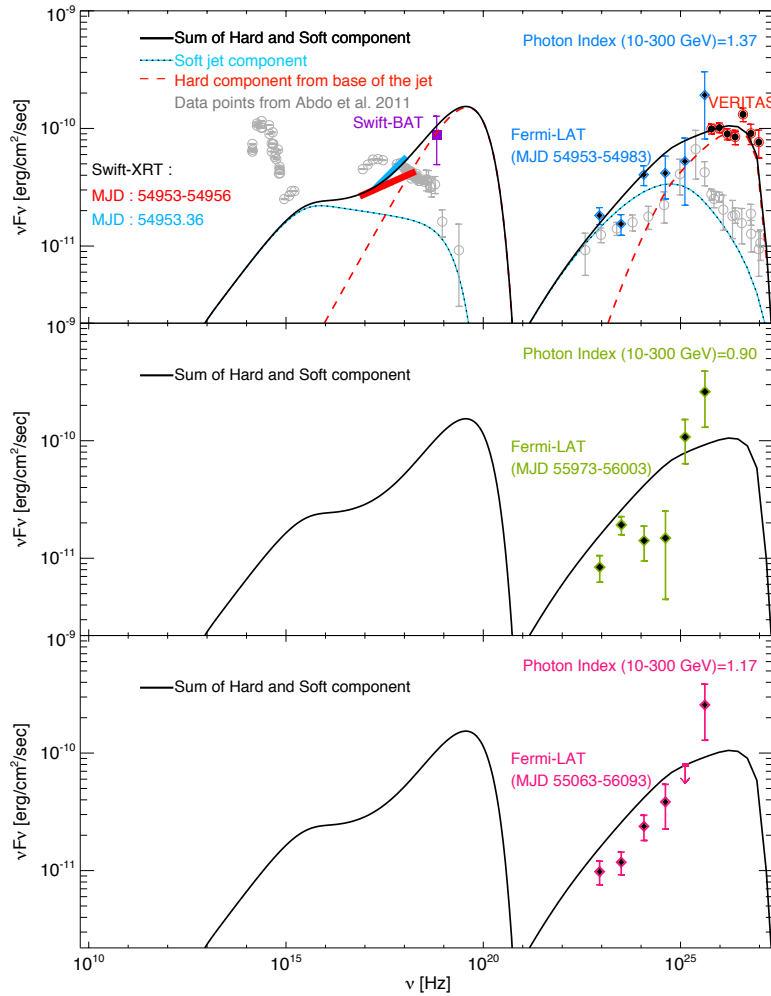
Singh et al , 2016,
[2016SPIE.9905E..1ES](#)

ASTROSAT simulations of TeV Blazars

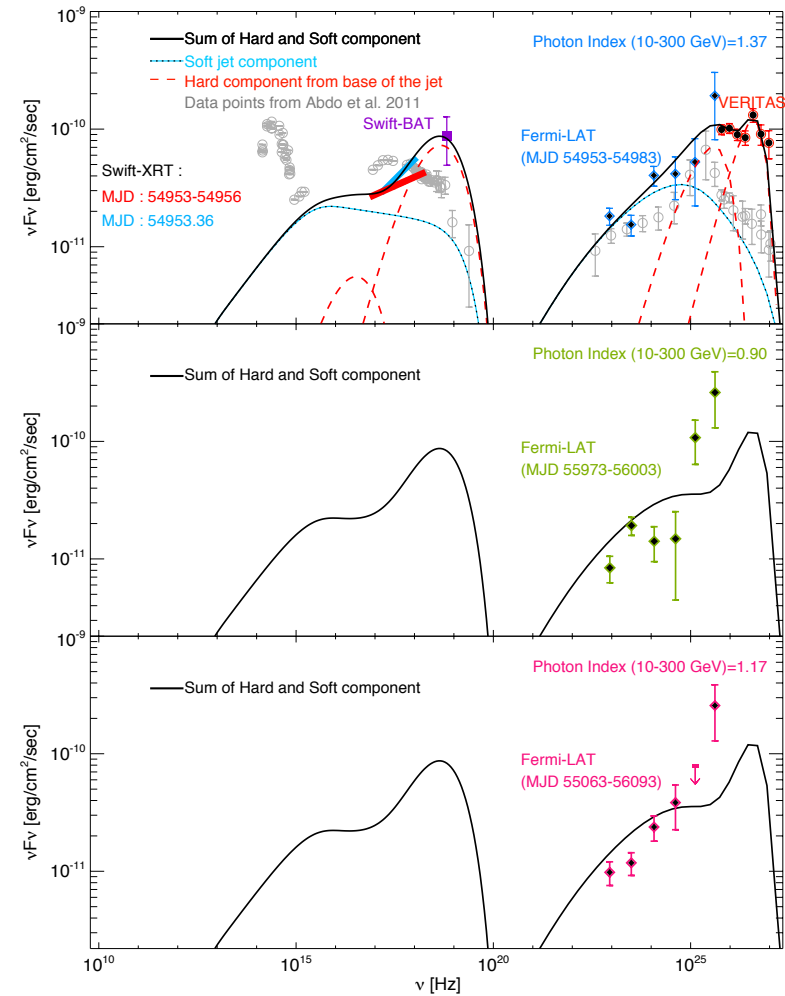


Multi Zone SED Model of Mrk 501

Narrow powerlaw

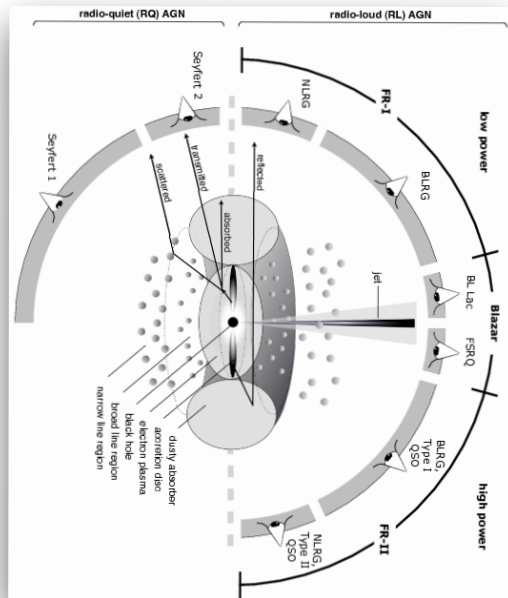


Relativistic Maxwellian

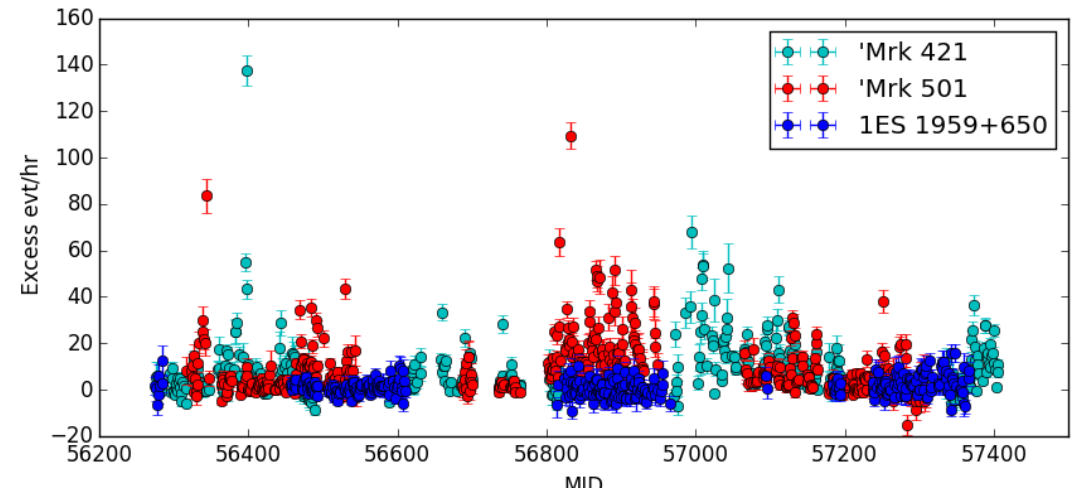


Shukla et al. 2016, ApJ

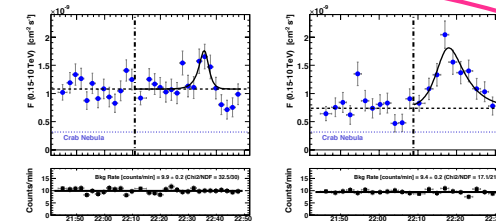
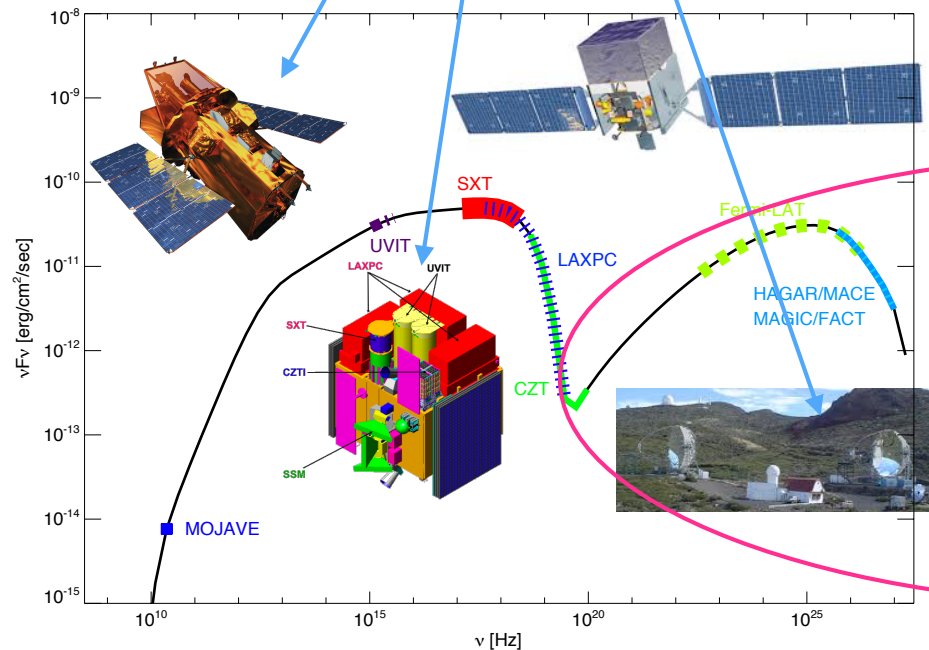
Strategy to pin down the emission mechanism



- **Mrk 421**
- **Mrk 501**
- **ES1959+650**



<http://fact-project.org/monitoring/>



Search for Rapid variability by MAGIC, VERITAS and MACE