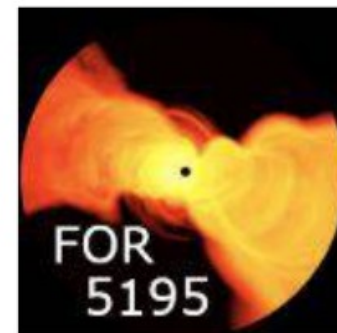
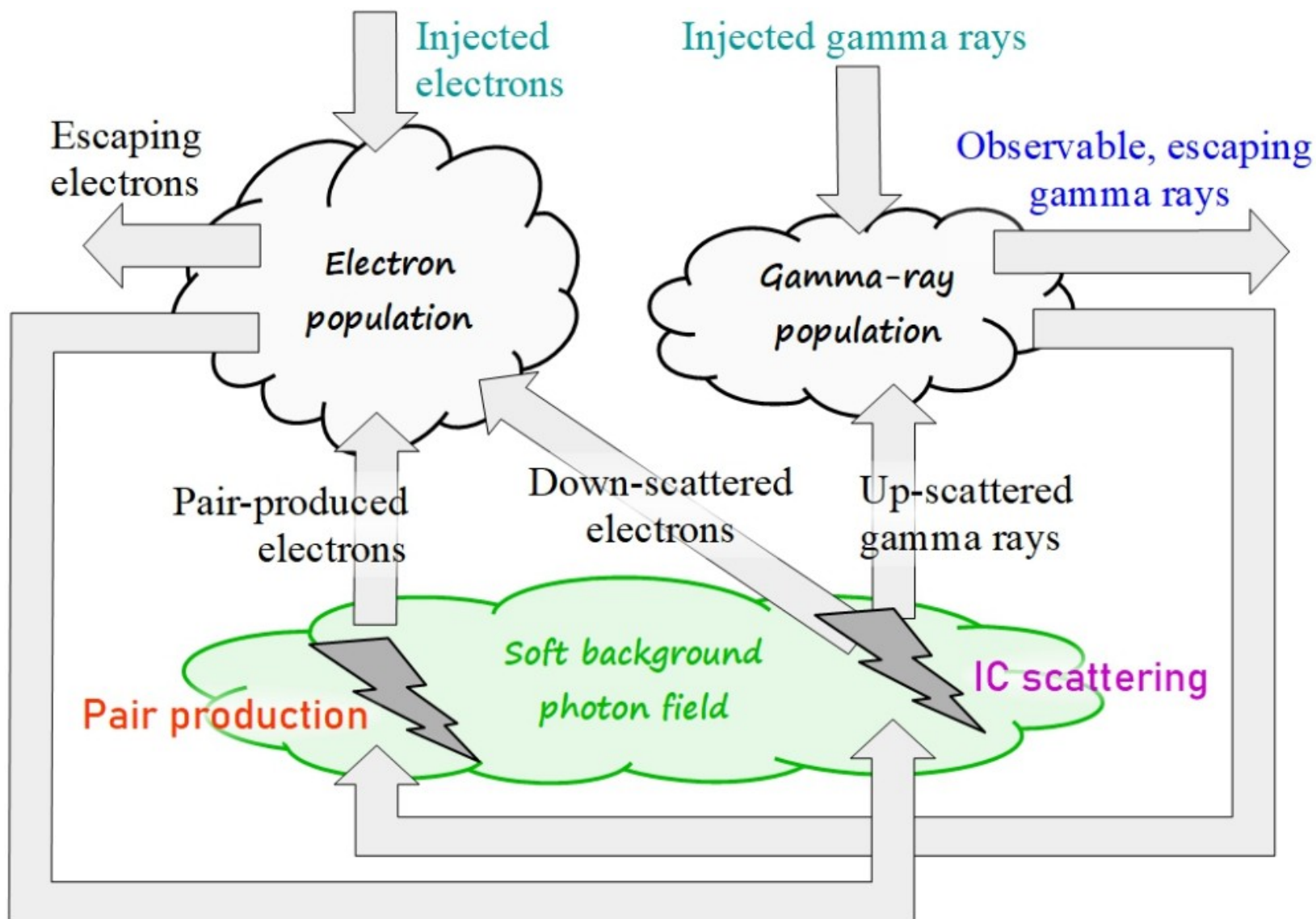
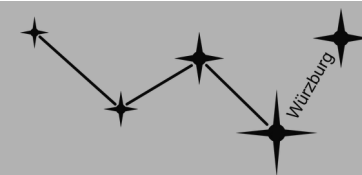


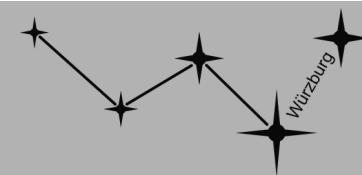
Gamma-ray astrophysics in Würzburg

Group report of AG Mannheim

Patrick Günther

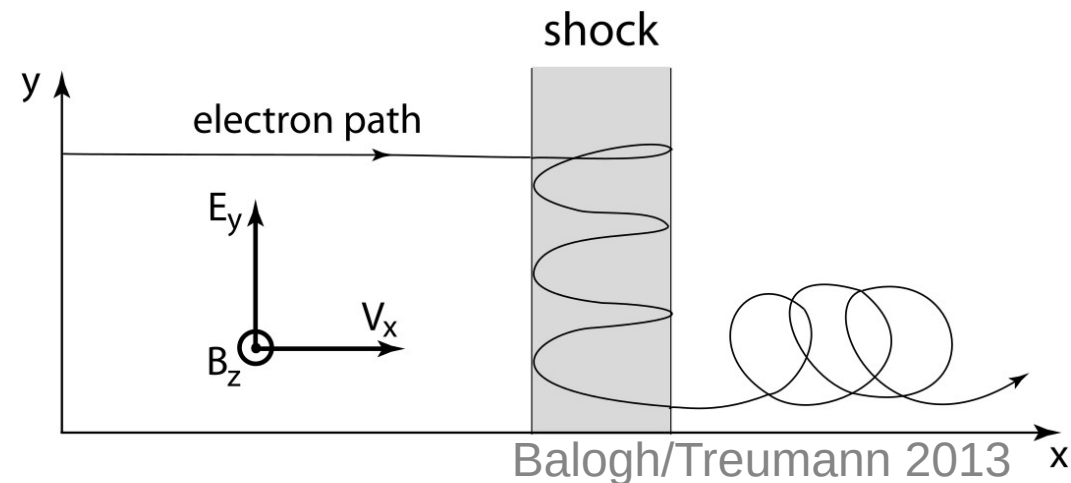
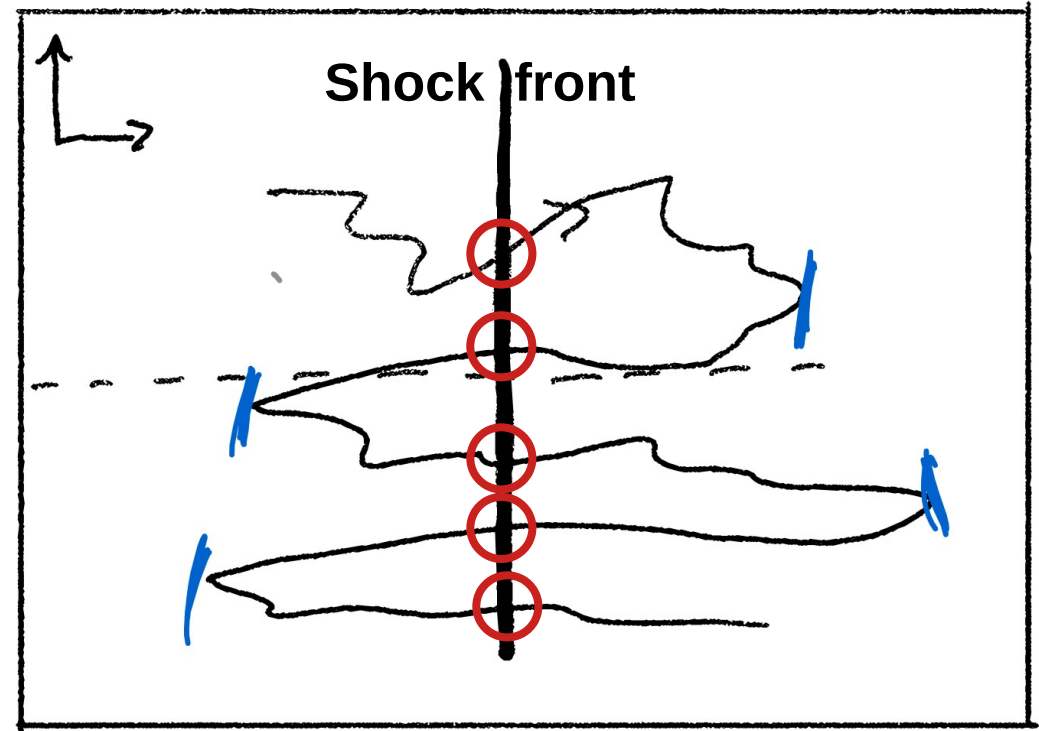


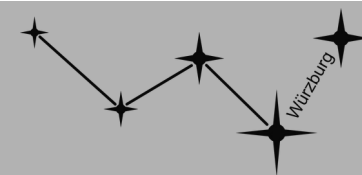
Christoph
Wendel



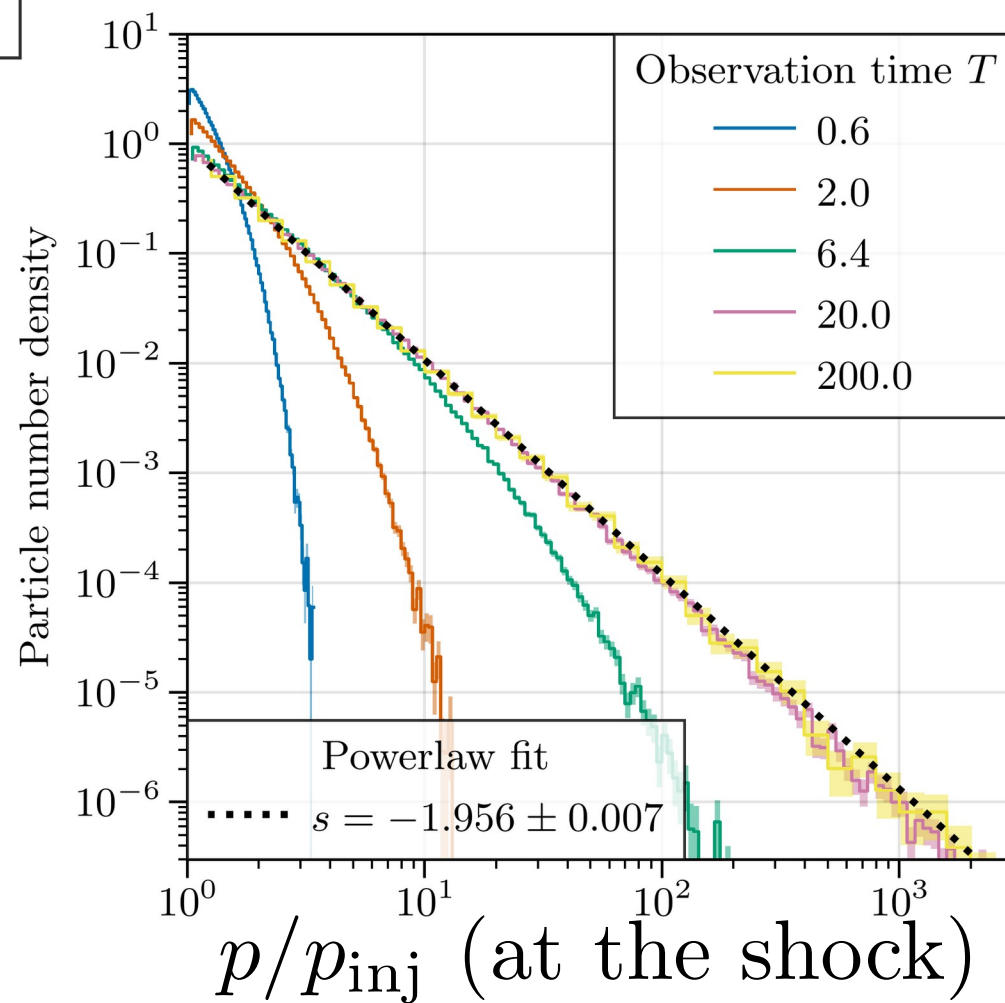
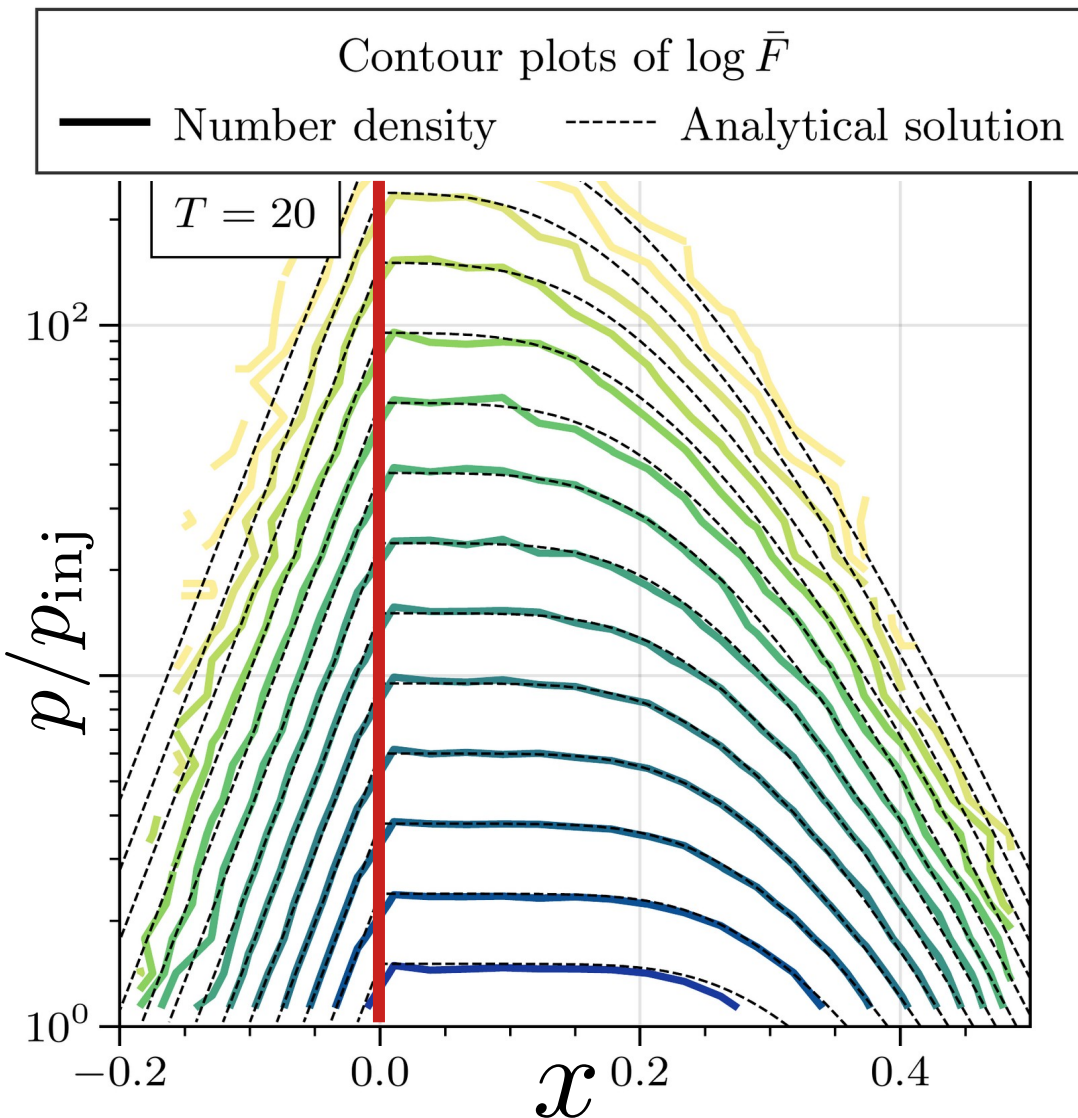
- 1st order Fermi acceleration (DSA)
- Shock drift acceleration
Particles accelerated by gradients/curvature of B field
- Shock surfing acceleration
Particles trapped inside the shock and acceleration by electric fields

e.g. Marcowith 2016



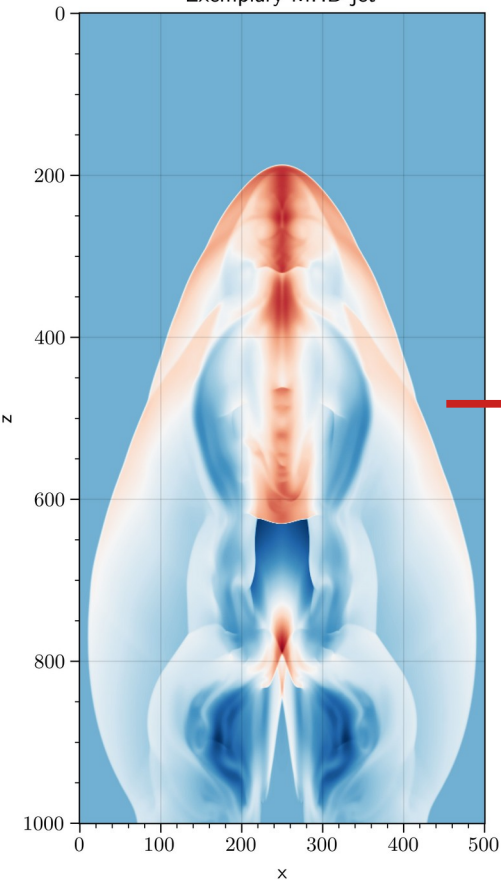


Spatial and momentum spectrum of particles for pure diffusive shock acceleration

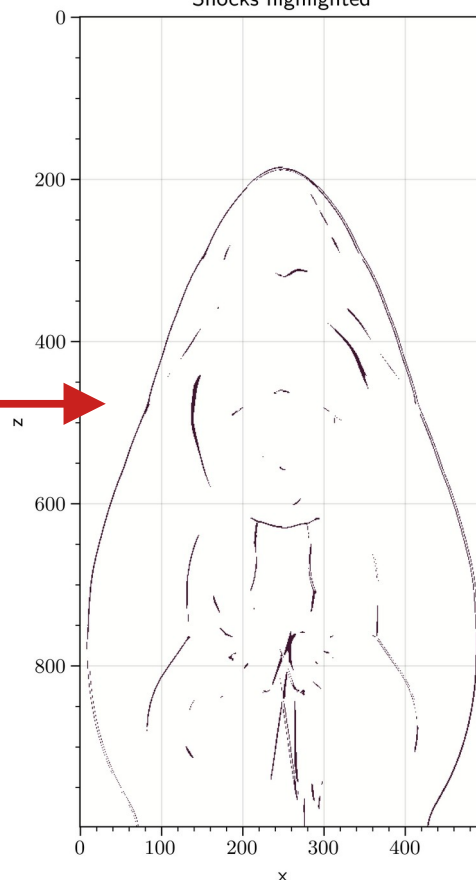


⇒ Work with MHD results

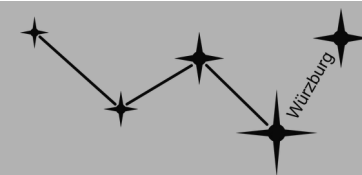
MHD run: Dubey/Vaidya/Fendt
Exemplary MHD jet



Shocks highlighted

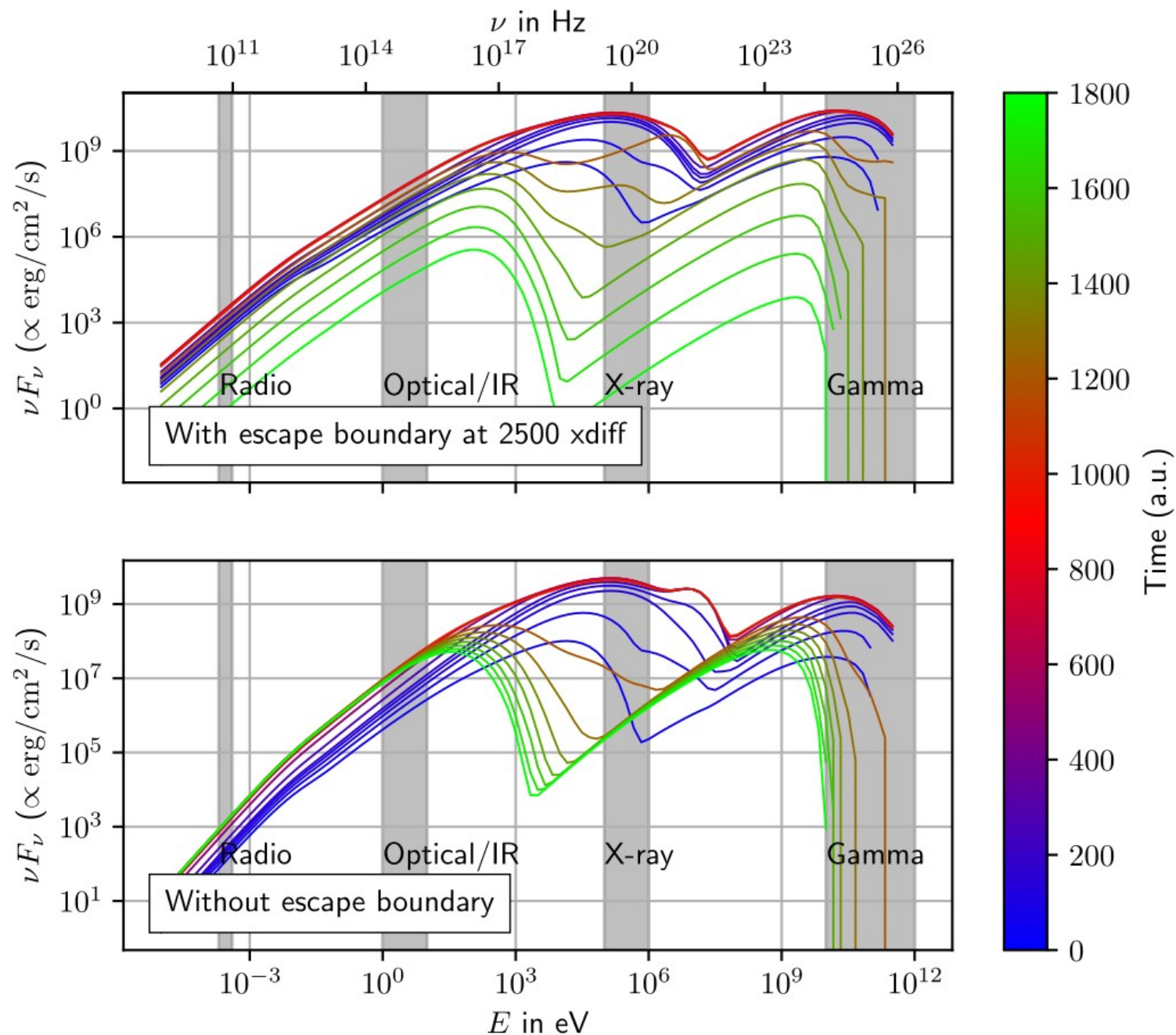


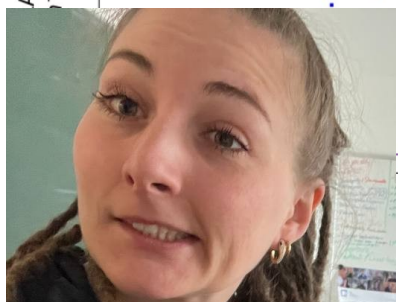
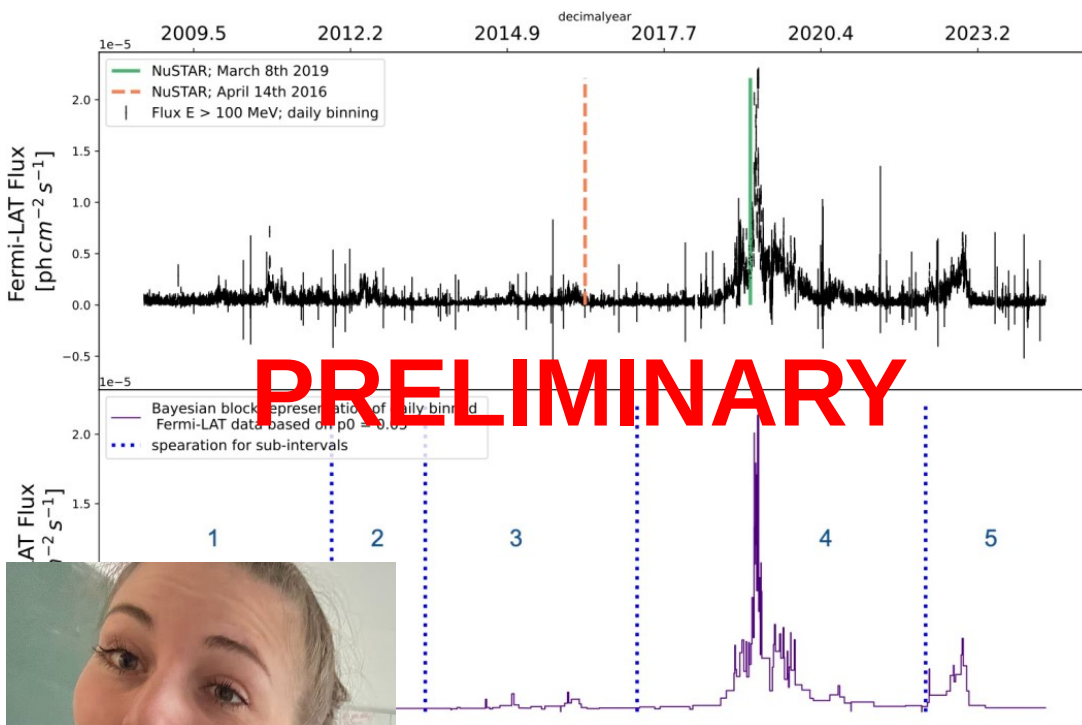
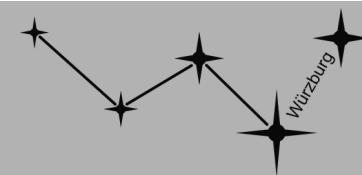
- **Aim: self-consistent model**
- **Shock and transport parameters estimated from MHD**
- **Time-dependent**
- **Multiple acceleration mechanisms**
 - Diffusive shock acceleration
 - Stochastic acceleration
 - Shock-drift/-surfing acceleration
 - **Combination?**



SSC: Synchrotron
Emission
+ Self-compton
emission

- based on the
calculated Electron
distribution
- Time-dependent
SED

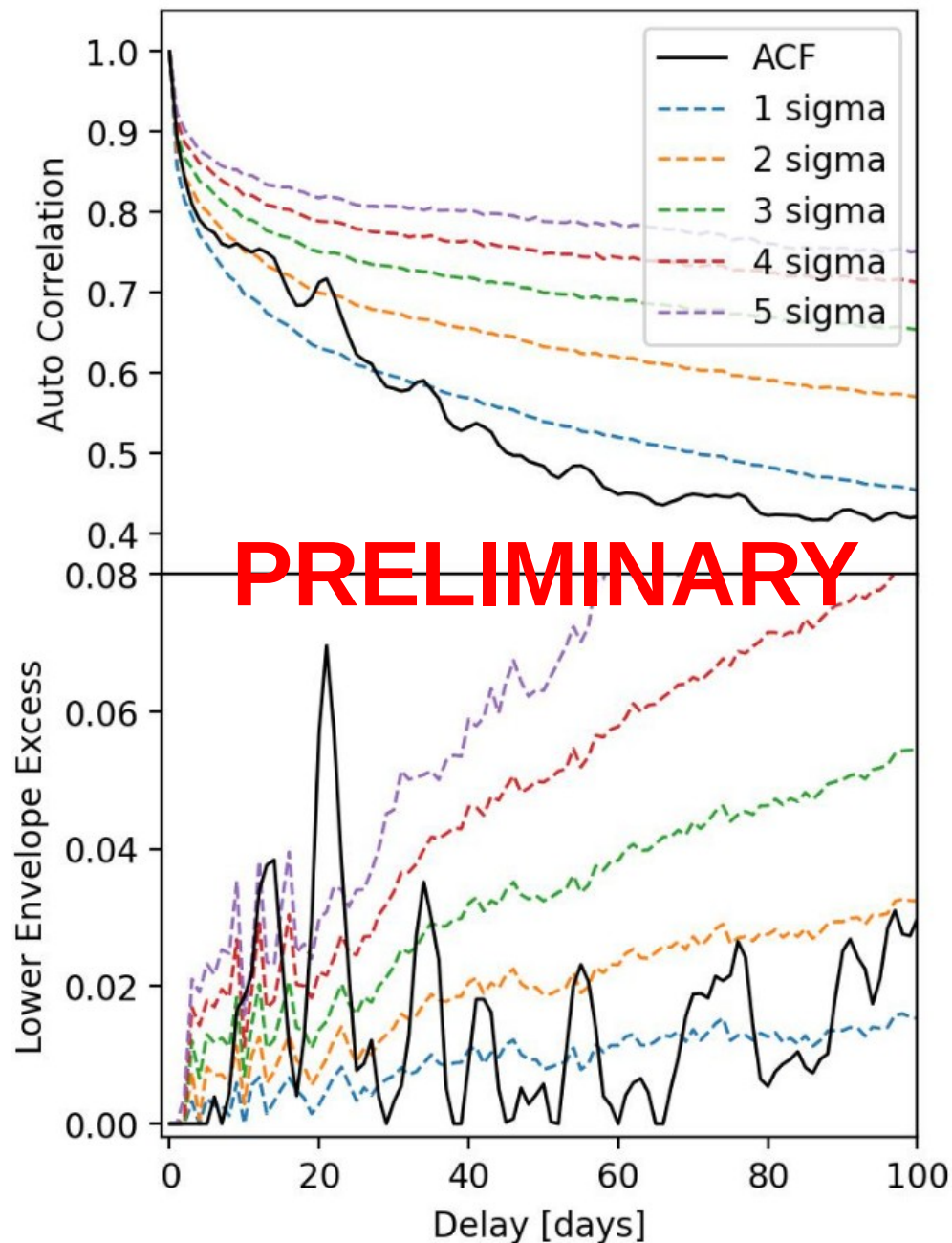


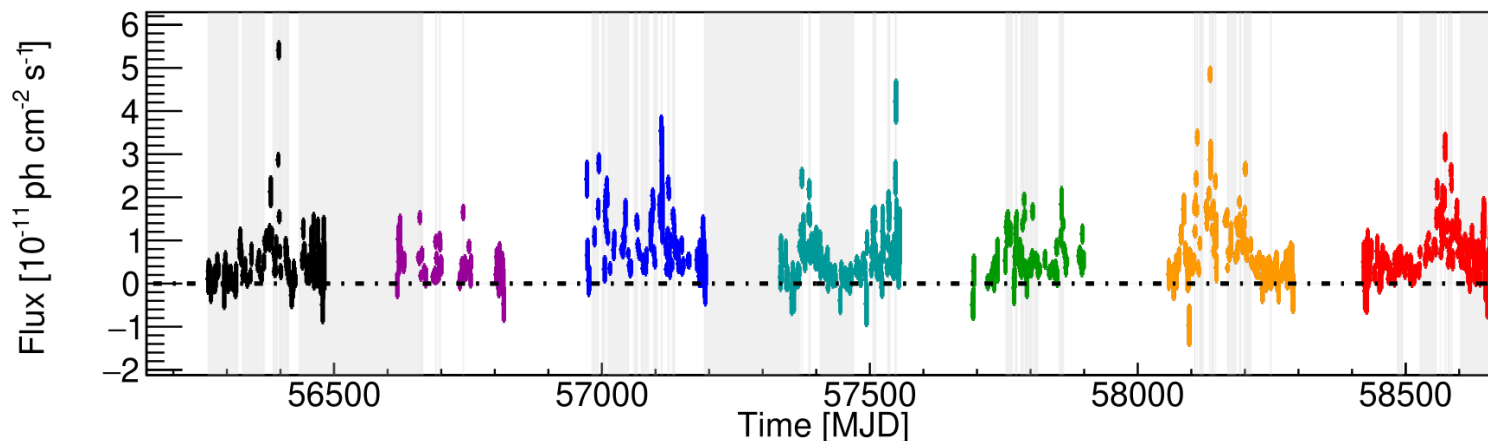
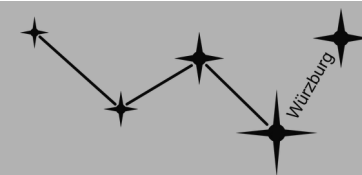


Sarah Wagner



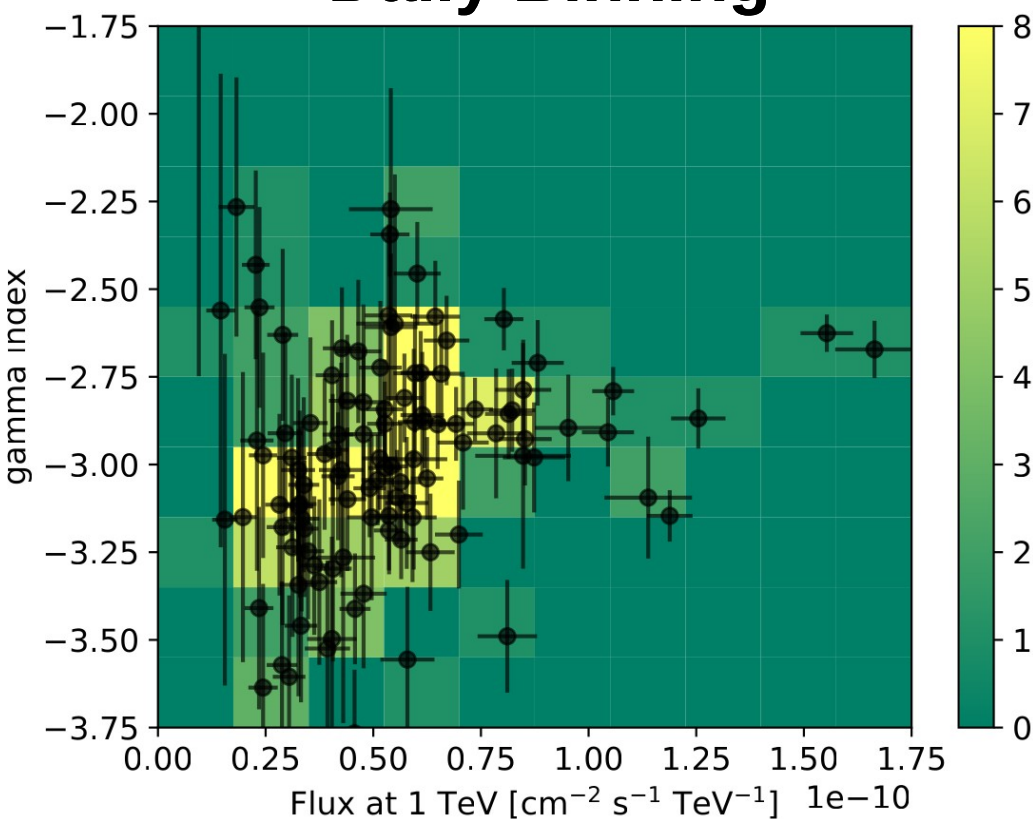
Patrick Günther



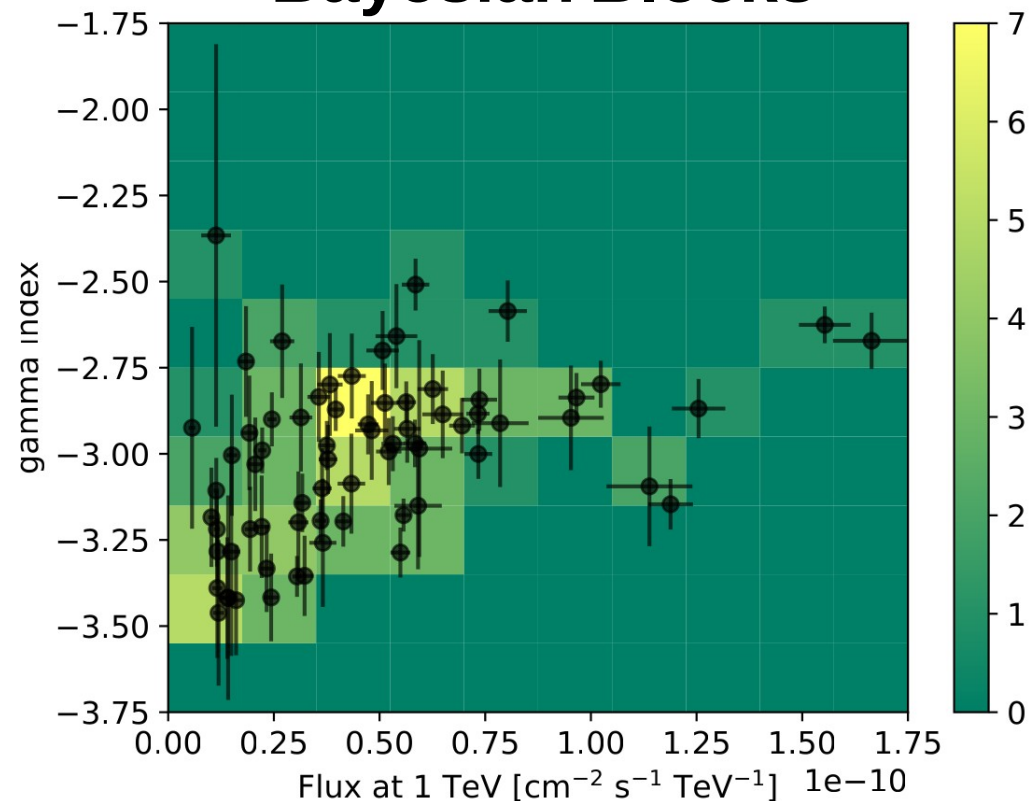


**Bernd Schleicher,
Daniela Dorner**

Daily Binning

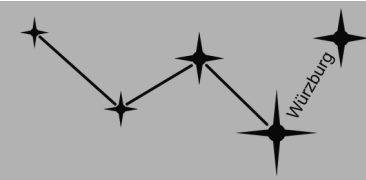


Bayesian Blocks



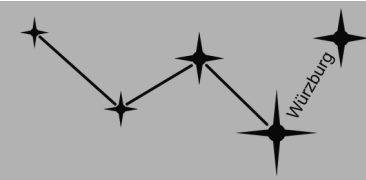
Observatorio del Roque de los Muchachos





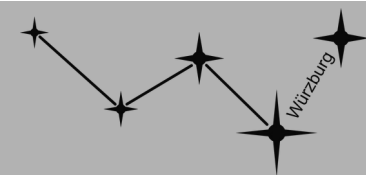
2025



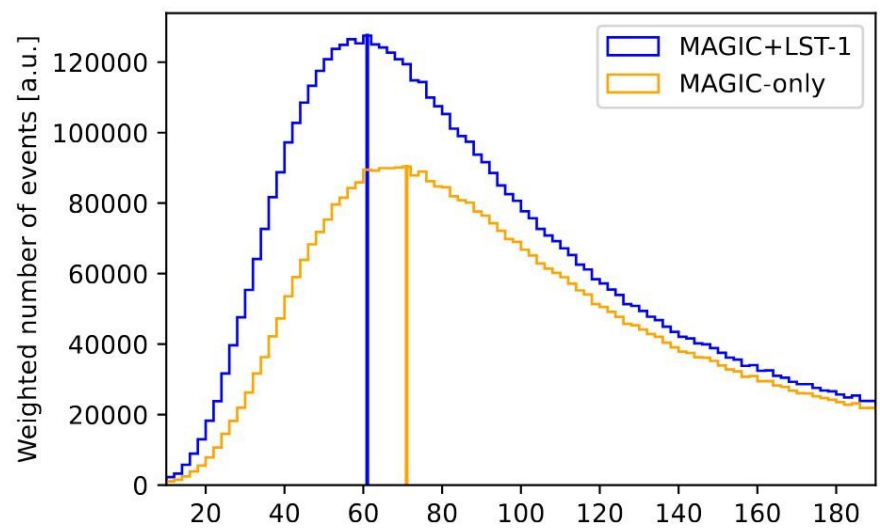
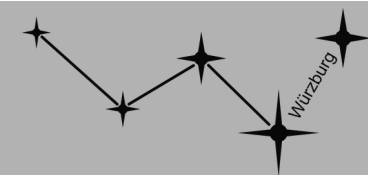


- First G-APD Cherenkov Telescope
- SiPMs
- Energy range: hundreds of GeV to 10 TeV
- Operated remote and automatic
- Total mirror area: 9.5m^2
- FoV 4.5 deg



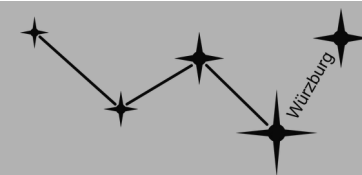


- Imaging Air Cherenkov Telescopes
- Canary Islands, La Palma, Observatorio del Roque de los Muchachos, 2200 meter a.s.l.
- Two 17-meter telescopes
- Energy range ~ 20 GeV to ~ 100 TeV
- Lightweight for fast repositioning



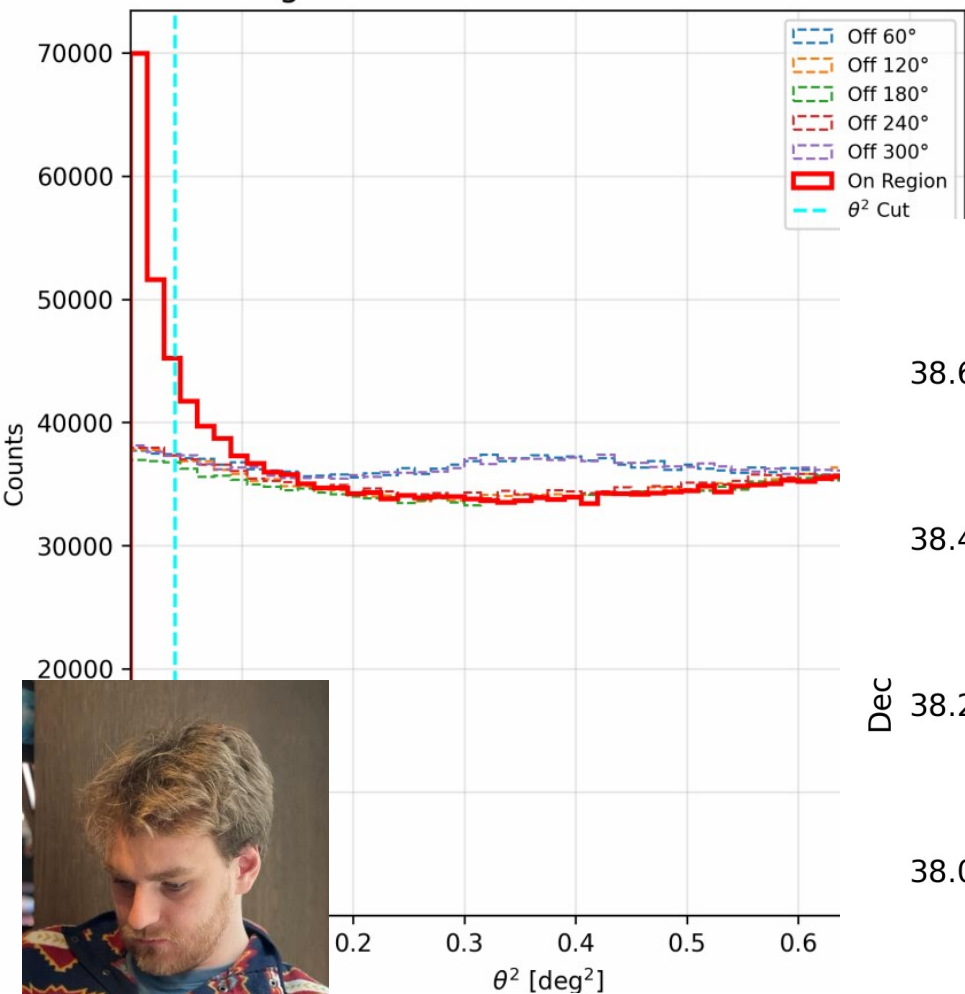
23m diameter mirror $\rightarrow$ $\sim$ twice the area of MAGIC



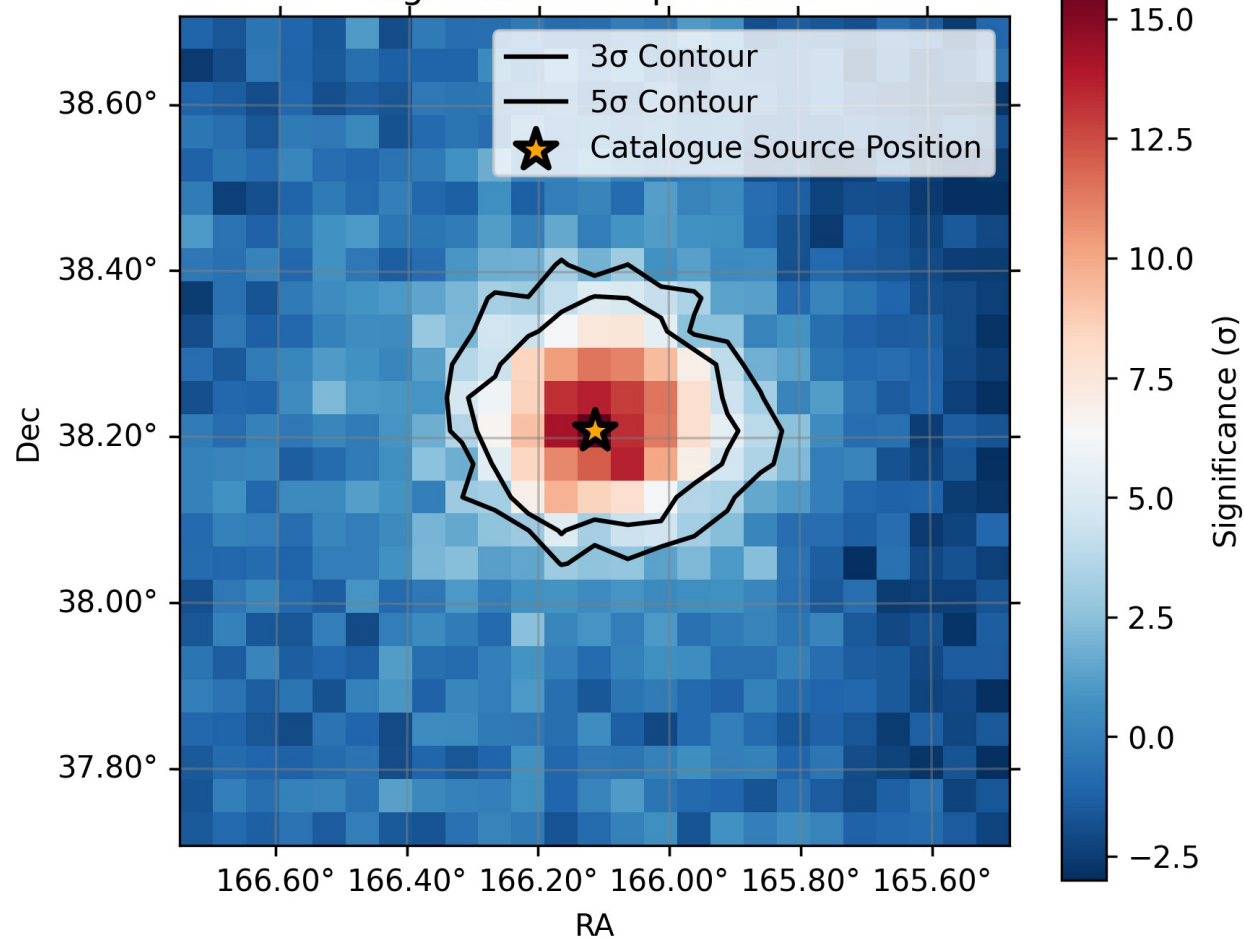


θ^2 Distribution for Mrk421

Li & Ma Significance = 1067.99σ with θ^2 cut = 0.04

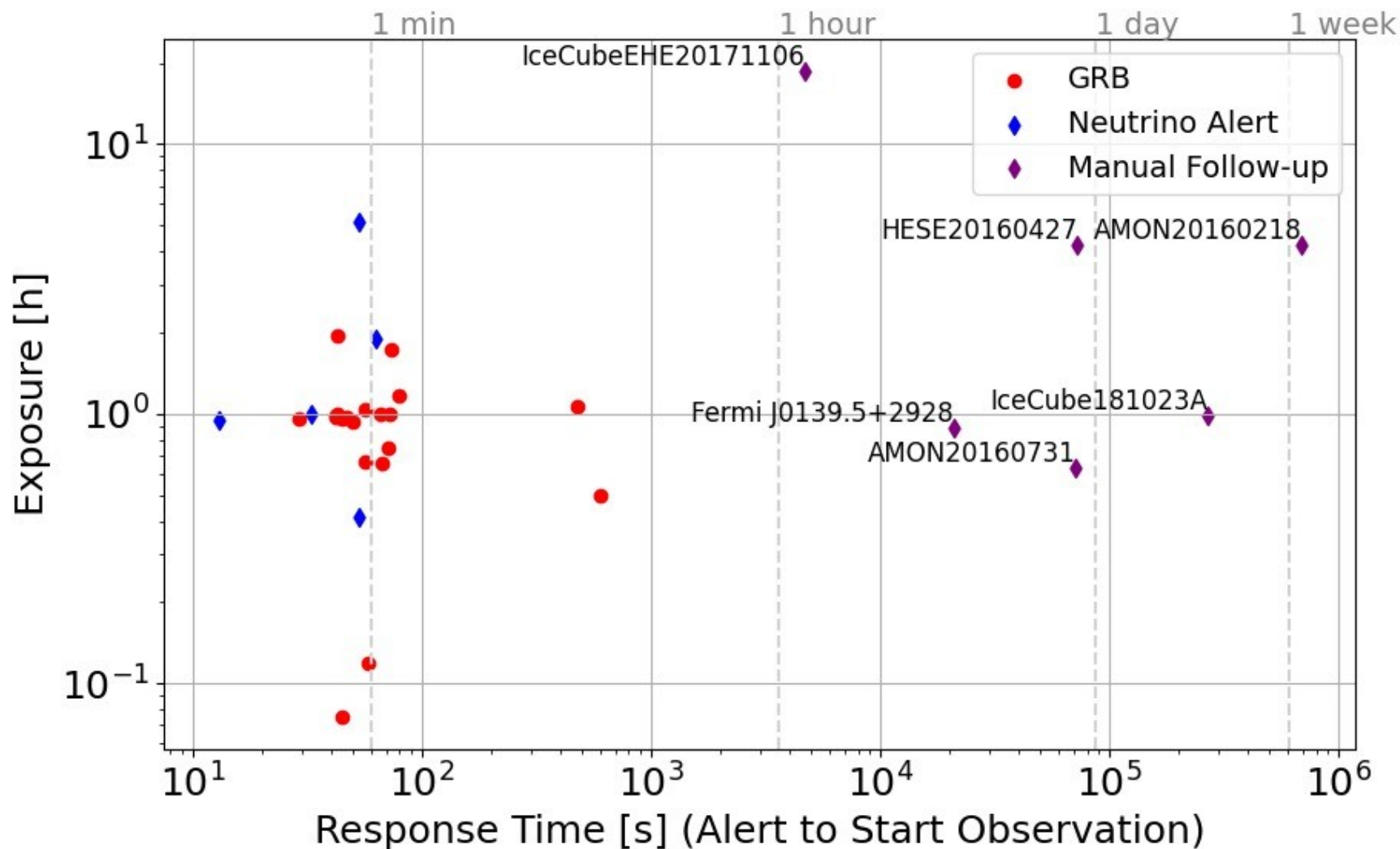
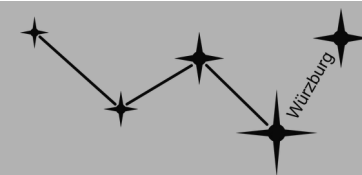


Significance Map Mrk421



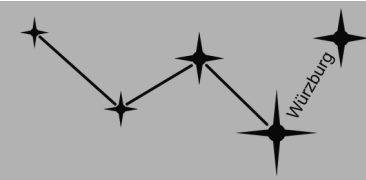
Felix Pfeifle

Alert follow up

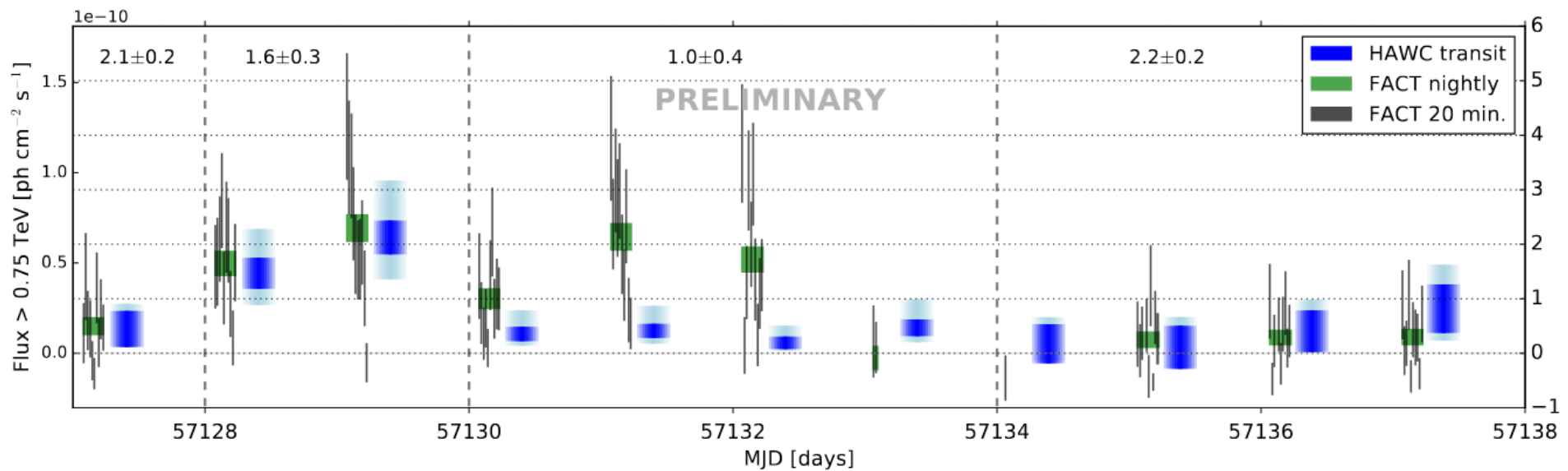


Marcel Vorbrugg

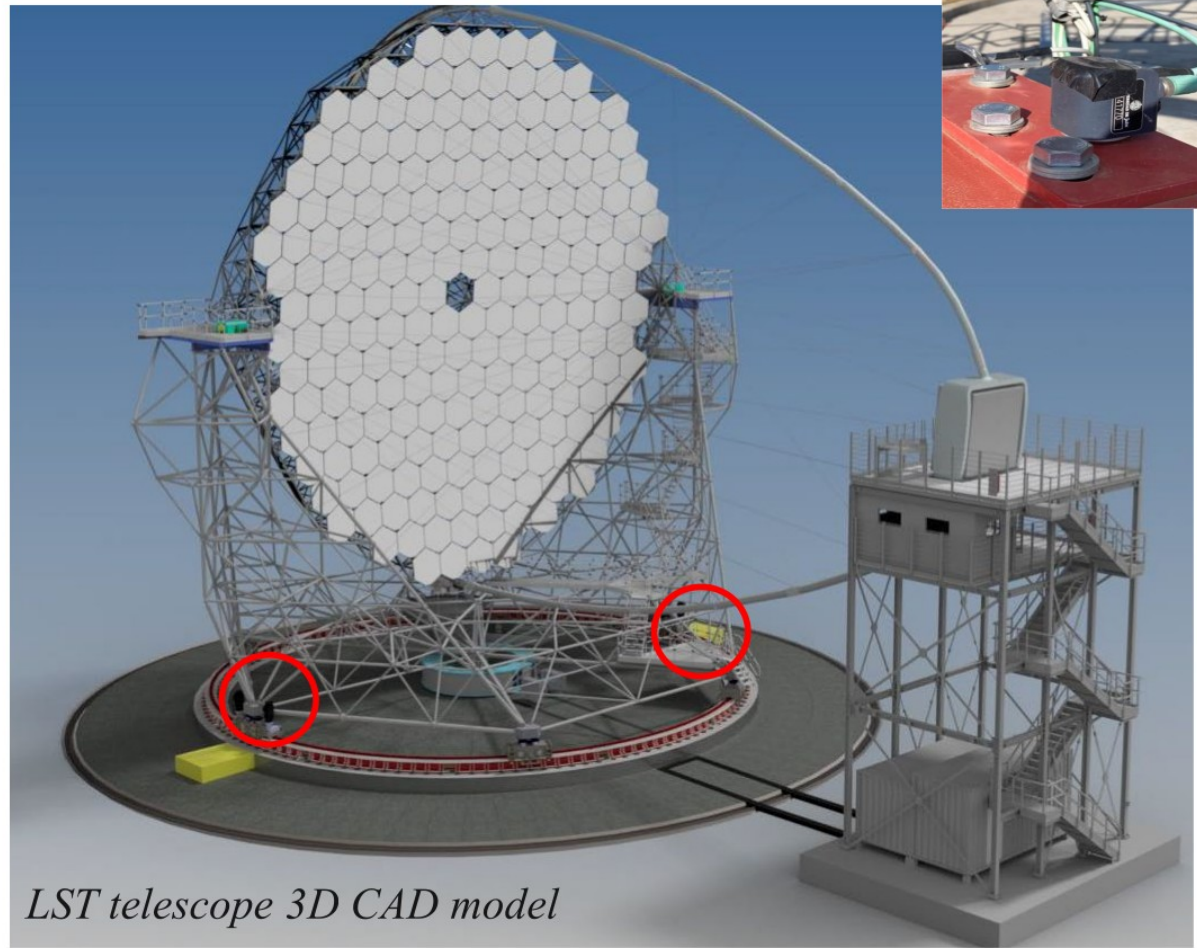
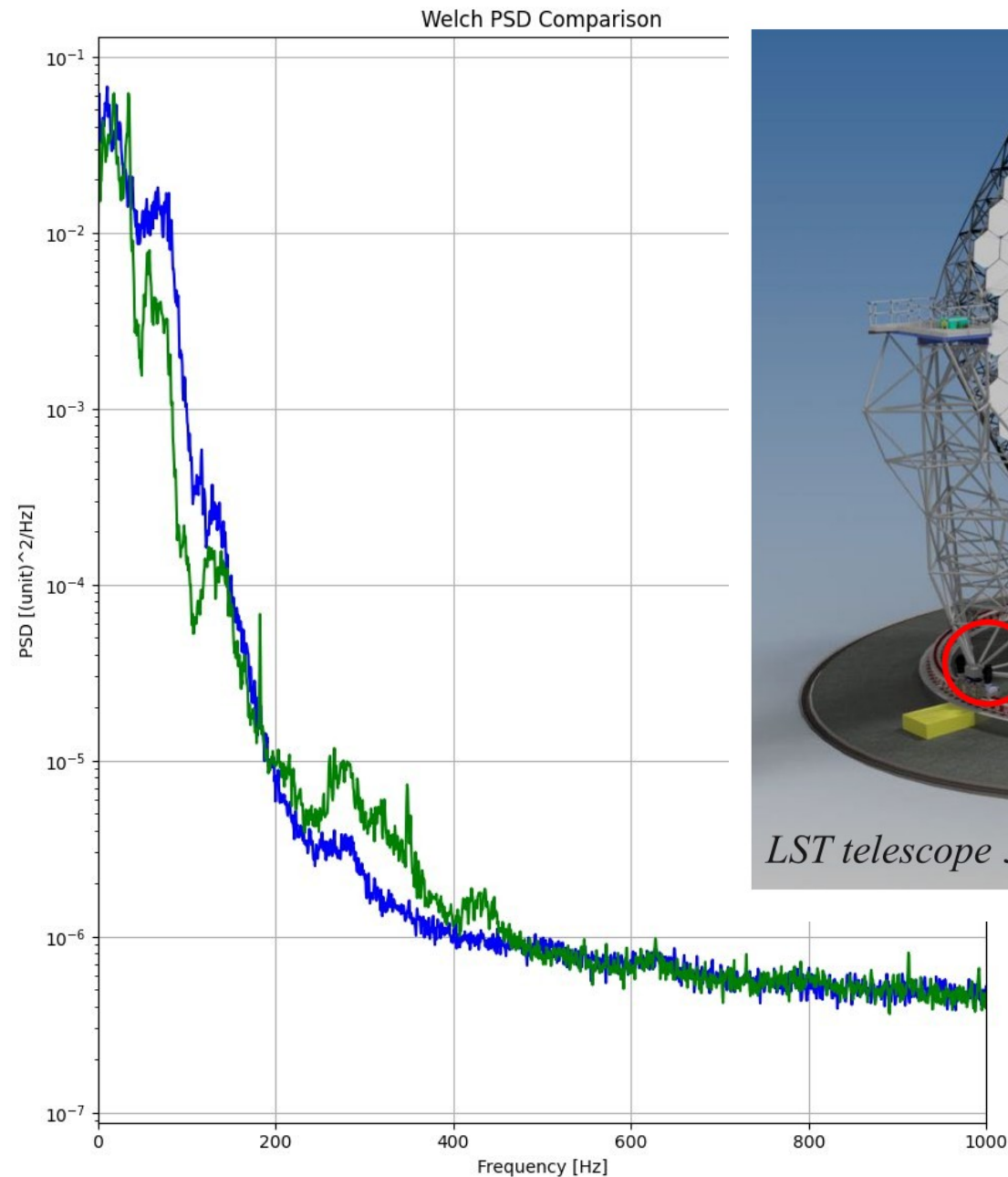
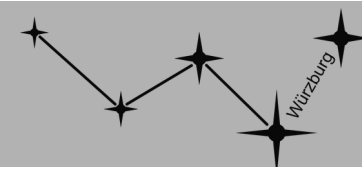
Fast automatic follow up, fastest 13s



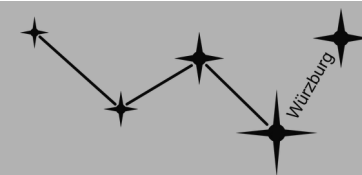
- combined analysis for extended Lightcurve coverage
- new, higher sensitivity available now → cross-validation necessary



Katharina Brand, Daniela Dorner



**Felix Pfeifle, Marcel Vorbrugg,
Karl Mannheim + collaborators
from TU Dortmund**



VEGA: Very Eco-friendly Gamma-ray Astronomy → PV cells on MAGIC

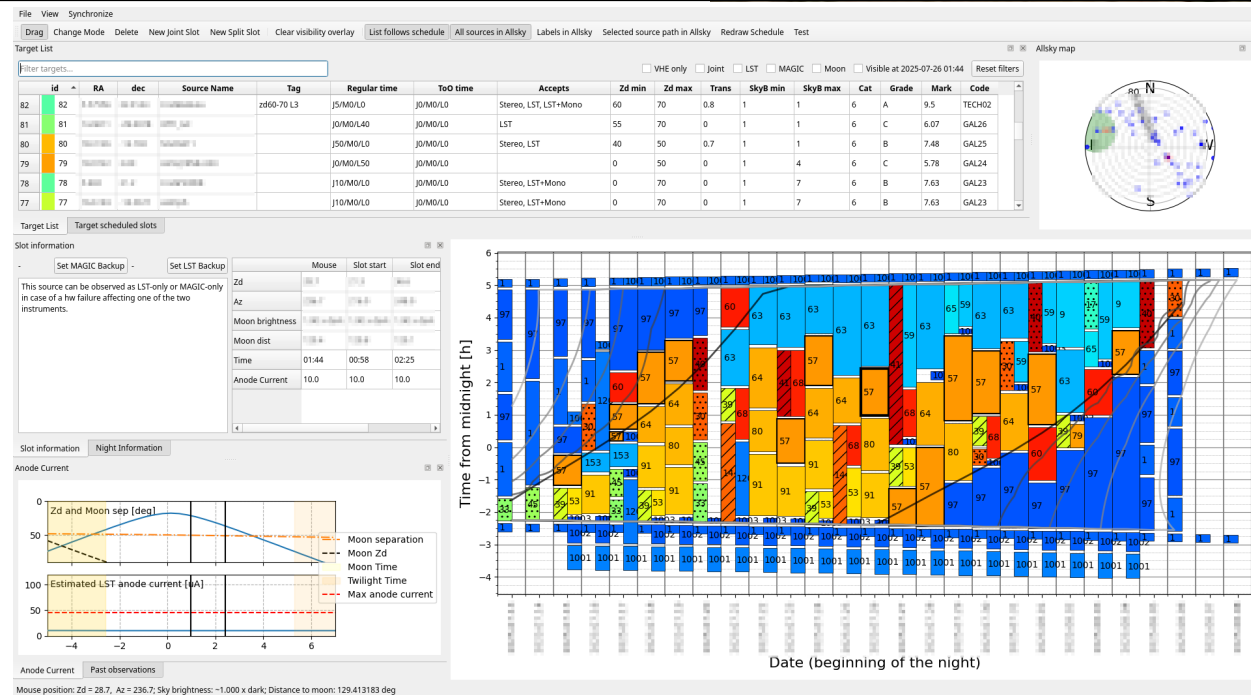
Karl Mannheim, Carla Wengel
+ other MAGIC members

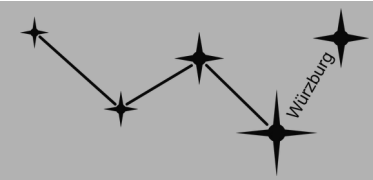


Joint MAGIC-LST Operations

→ Observation scheduling

Me, Marcel Vorbrugg
+ other MAGIC and LST members





Thank you for your attention