

Long term study of the blazar S5 0716+714: investigating a turbulent jet at all wavelengths

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Introduction



- **Master study at University of Rijeka (graduated 09/2021)**
Thesis title: Searching for correlations between optical polarization and VHE gamma-ray emission in the blazar S5 0716+714
Supervisor: Marina Manganaro
- **PhD at University of Siena - start 11/2021**
Expected to finish 12/2024
Supervisor: Riccardo Paoletti
Co-supervisors: Giacomo Bonnoli & Marina Manganaro

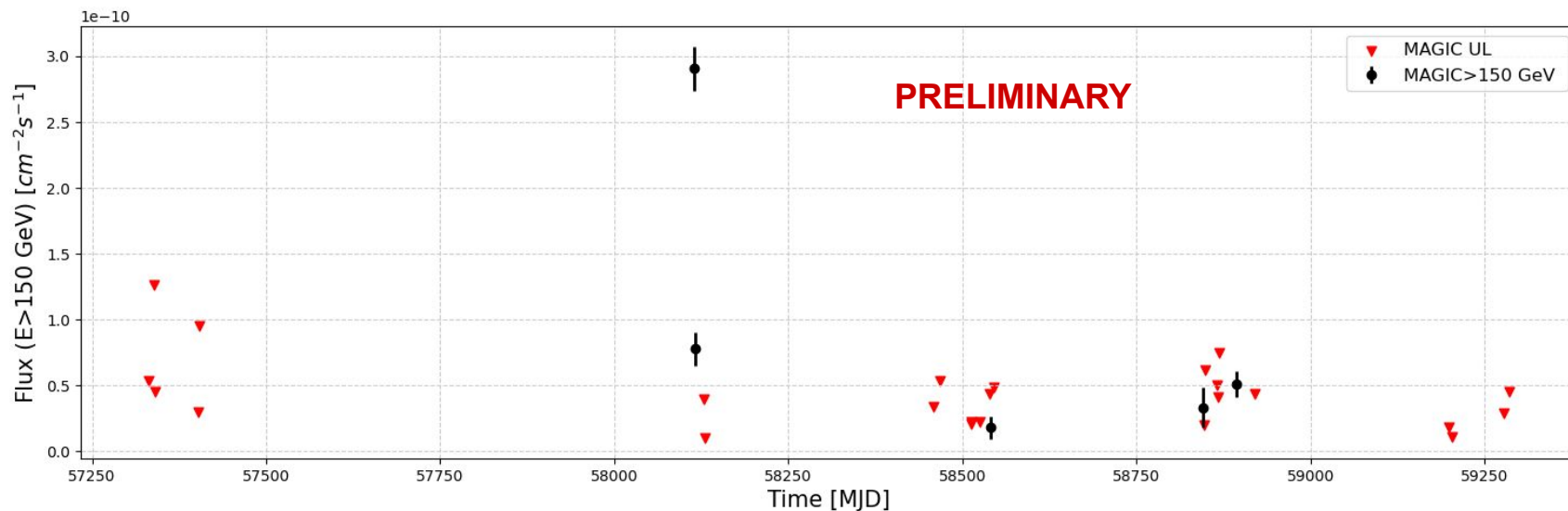
Research activity during PhD

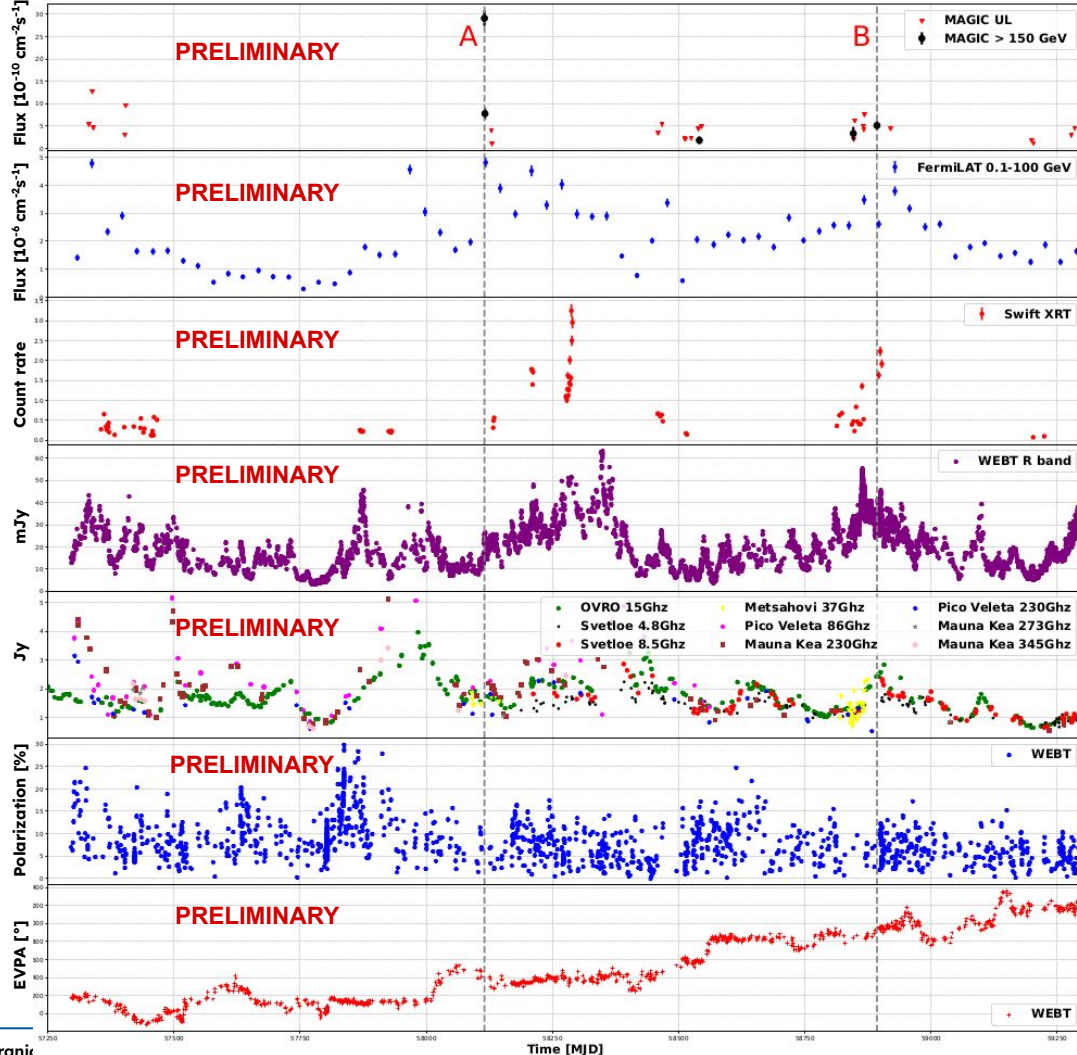


- **Focus on blazar S5 0716+714:**
 - **VHE gamma ray data analysis across several observational cycles (2015-2022)**
 - **analysis of HE and x-ray data**
 - **collecting all available MWL data**
 - **modelling of the source high (flaring) and quiescent state**
 - **theoretical explanation of VHE emission mechanisms**
- **MAGIC and LST shift data taking**
- **PI of MAGIC proposal in previous cycle + new re-submitted**

Overview of MWL monitoring

- Period of the monitoring: November 2015 to March 2021
- MAGIC observed source for **34** nights in this period between 40° - 50° zenith angle
- Total integration time: **34.54 h** [\(ATel #: 11100\)](#)





VHE

HE

X-ray

R-band

Radio

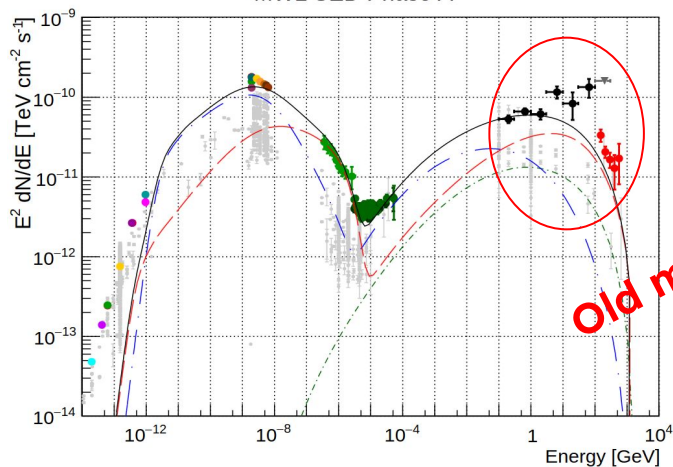
Polarization

EVPA

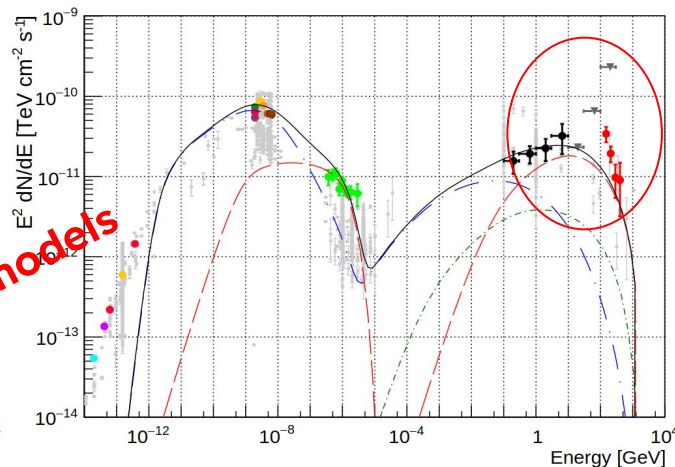
- MWL light curve with data currently available for the source
- Two different models in plan

Previous model

MWL SED Phase A

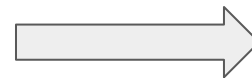


MWL SED Phase B



Old models

(Ahnen et al. 2018)



ONGOING!

- Modelling currently ongoing - first tries show that simple one zone model can't describe current data

Future goals



Plans for a work within LST:

- To join some existing project within EGAL PWG?
- Analyze the data?
- Keen to get involved in one of the tasks Alessio mentioned
- Possibility of drafting a new proposal with some interesting extragalactic targets for which LST could be suitable instrument - has to be discussed with Siena/Pisa team

Upcoming LST analysis school in few weeks - good opportunity to learn analysis and be ready to contribute to the group