

ILANCE Presentation June 6th

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Institute for Cosmic Ray Research

6 June 2024

Myself Introduction :

école
normale
supérieure
paris-saclay

université
PARIS-SACLAY

- French Student
- Paris-Saclay University and ENS Paris-Saclay
- 1st Year of Masters Degree (Fundamental Physics)

Myself Introduction :

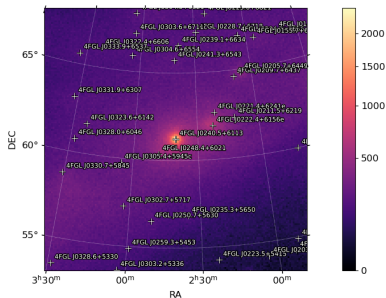
I L Λ N C E

International Laboratory for Λ strophysics,
Neutrino and Λ osmology Experiments



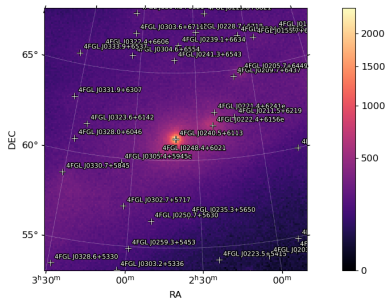
- Intern of ILANCE Program
- At ICRR until August
- Supervisors : Dr. Daniela Hadasch & Dr. Marcel Strzys

Target Presentation : LSI +61 303



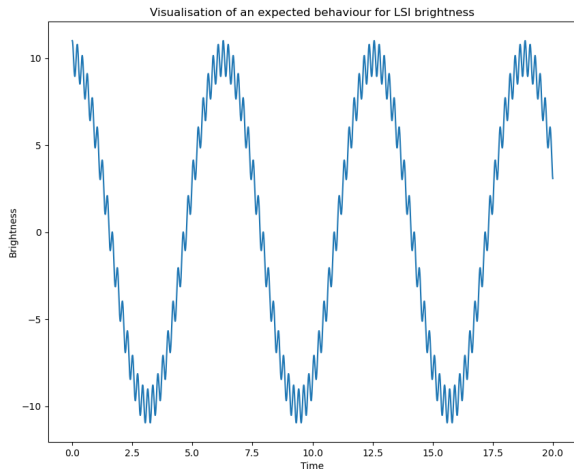
- LSI +61 303
- Binary system : Be Star + Pulsar
- 26.4960 days orbit
- Superorbital behavior (1667 days)

Target Presentation : LSI +61 303

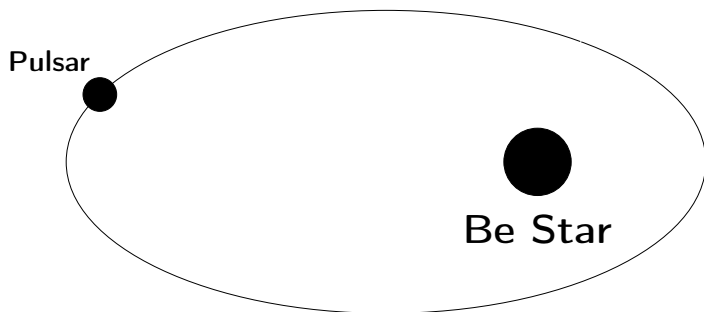


- LSI +61 303
- Observed in all wavelengths
- Gamma Binary (only ~ 10)
- Only known Gamma Binary + Superorbit

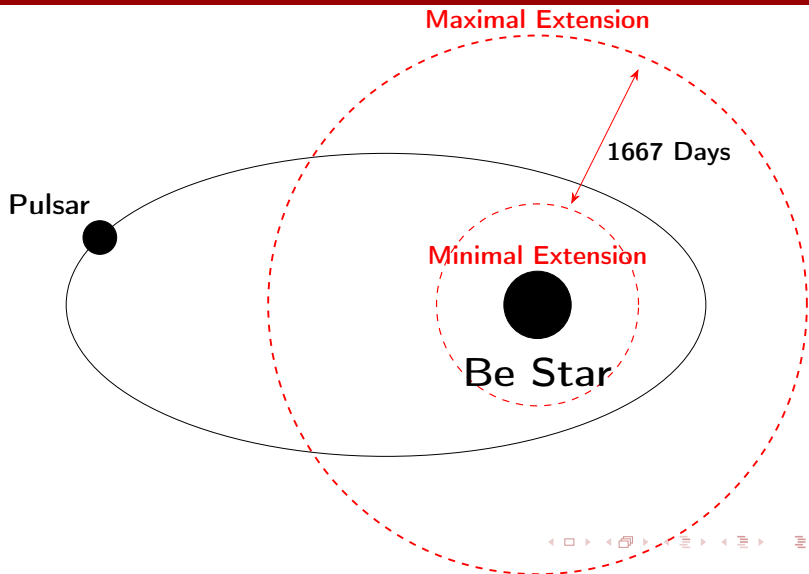
LSI Suspected (Superorbital) Behaviour



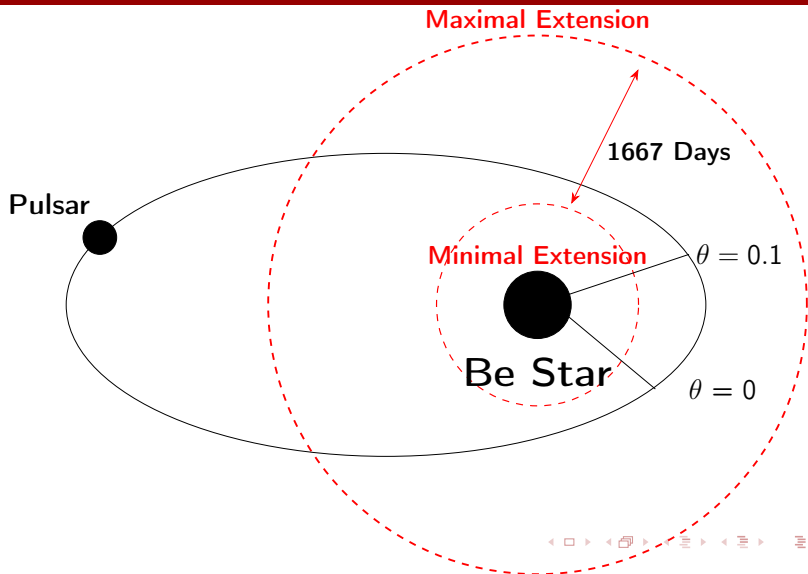
Superorbital Behaviour



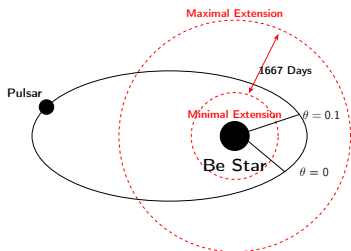
Superorbital Behaviour



Superorbital Behaviour



Superorbital Behaviour



- Known in other wavelengths
- Be Disk variations
- Should be orbital phase dependent (Pulsar)
- Changes in spectrum ?

Fermi Gamma-ray Space Telescope

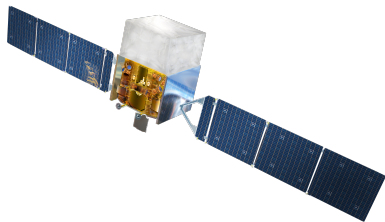


Figure 2: Fermi Space Telescope

- Gamma Ray Space Observatory
- NASA Instrument
- June 2008 : 15 Years of Data
- Energy range: 20 MeV to > 300 GeV (LAT)
- Scan whole sky every 3 hours

Lightcurve over Orbit at Superorbital Phase Bin 0.7-0.8

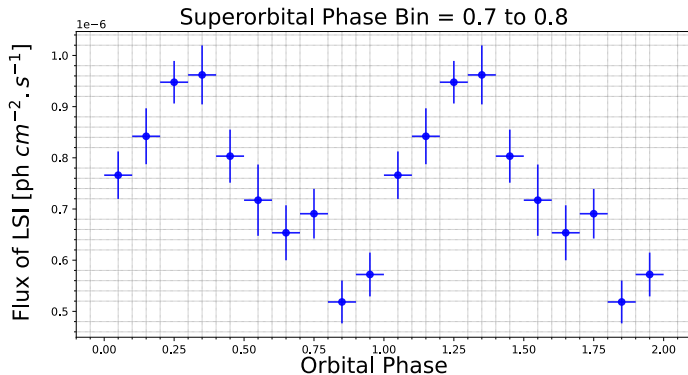


Figure 3: Lightcurve of the Flux of LSI over its Orbit at a Fixed Superorbital Phase Bin (0.7-0.8)

Lightcurve over Orbit at Superorbital Phase Bin 0.7-0.8

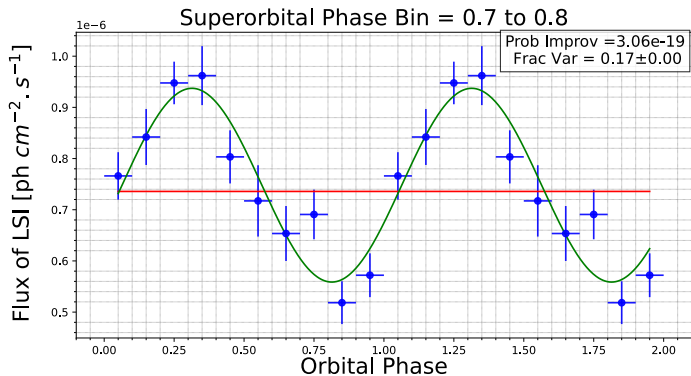
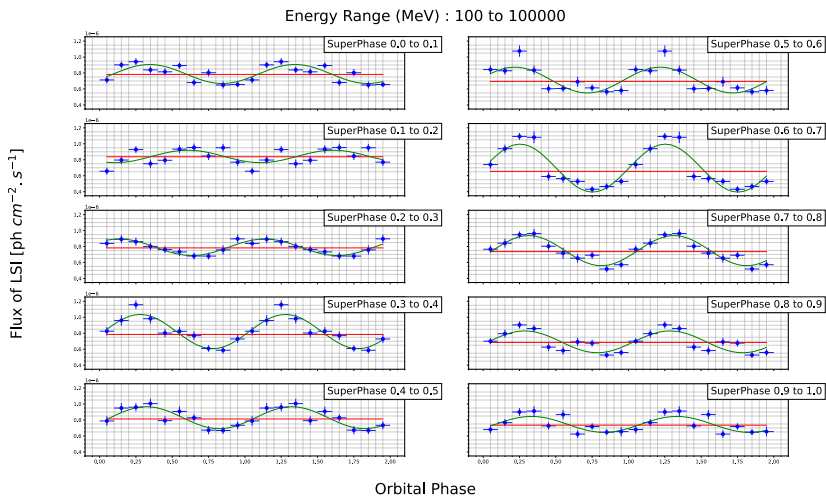
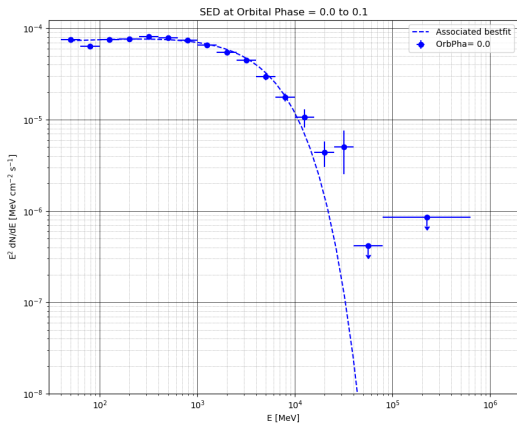


Figure 4: Sine vs Constant fitting of LSI Flux

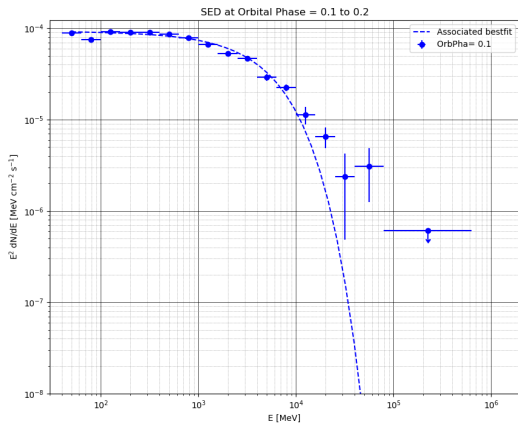
Lightcurves over Orbit at Different Superorbital Bins



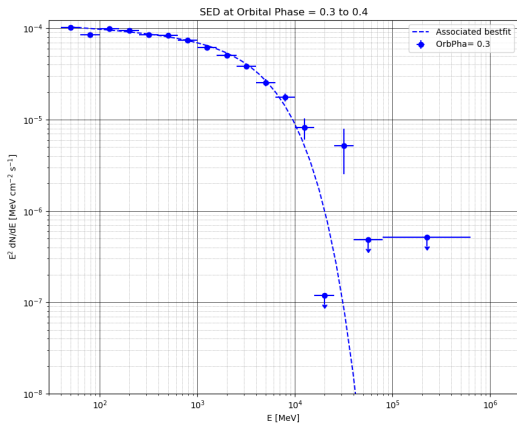
Spectral Energy Distribution (SED) at Fixed Orbital Phase Bin



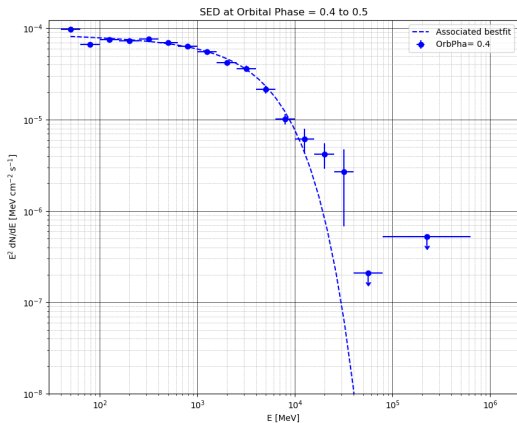
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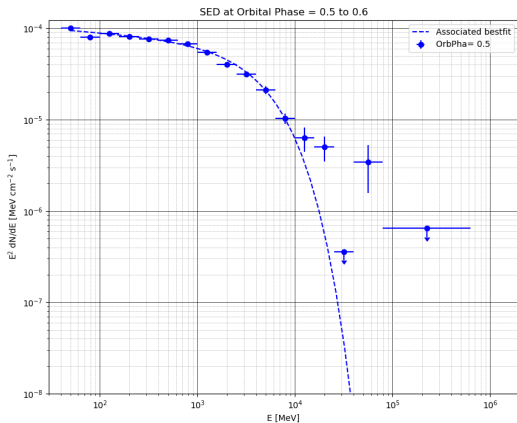
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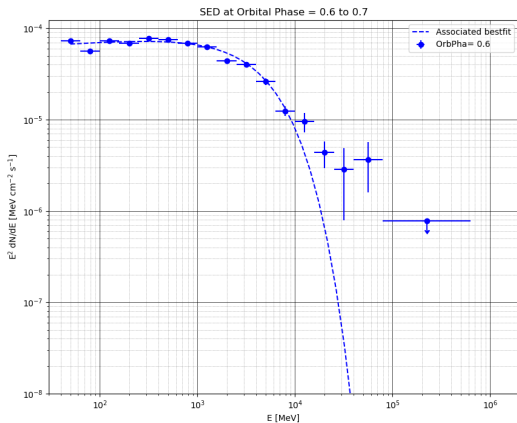
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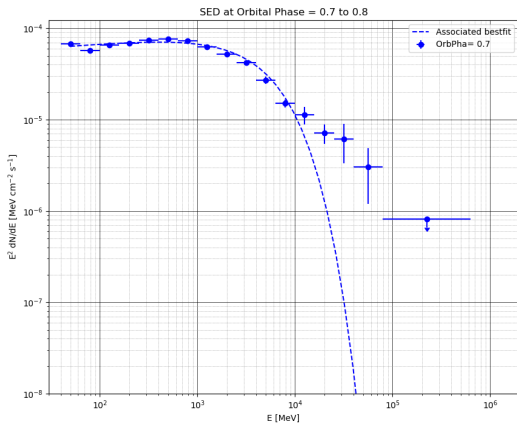
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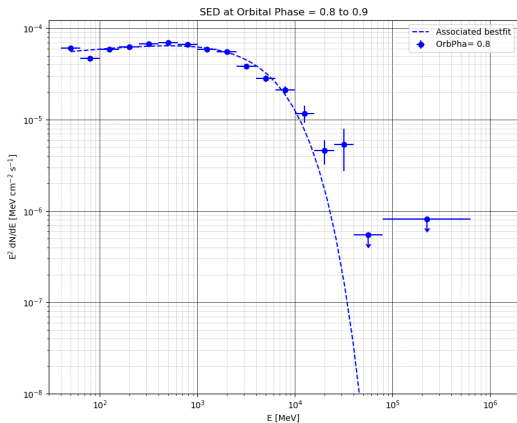
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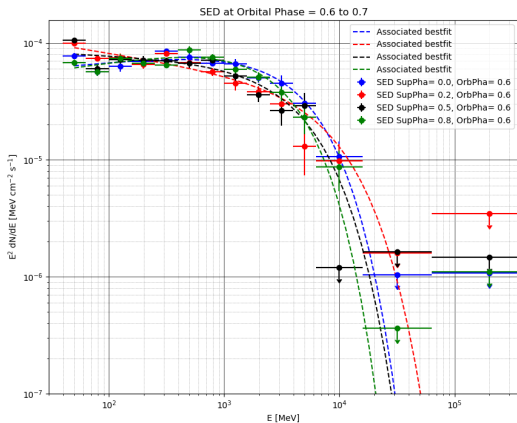
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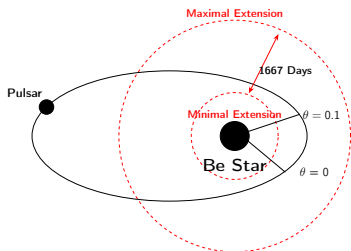
Spectral Energy Distribution (SED) at Fixed Orbital Phase Bin



Spectral Energy Distribution (SED) at Different Superorbit Phases



What's Next ?



- Quantify Spectral Variations
- Source of Variations ?
- Pulsar = Be Disk Probe ?

Thank you for listening