

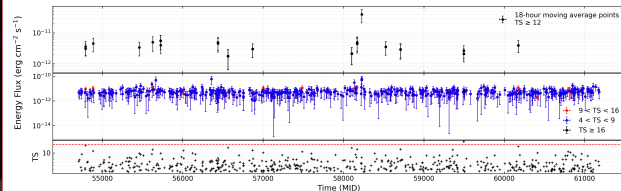
Transient γ -rays from ZTF J1901+1458

An ultramassive, rapidly rotating,
highly magnetized white dwarf

Key Results

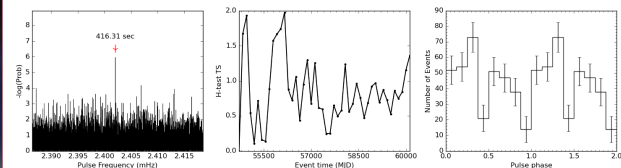
- ZTF J1901+1458: $M \sim 1.35 M_{\odot}$, $R \sim 2140$ km, $B \simeq 600\text{--}900$ MG, $P_{\text{spin}} = 416.2$ s.
- Rotational reservoir: $E_{\text{rot}} \simeq 2.8 \times 10^{45}$ erg.
- Candidate transient γ -ray episodes at $\sim 3\text{--}4\sigma$ in 6-hour *Fermi*-LAT bins.
- Timing analysis revealed indication of low level pulsed emission at the spin period of the white dwarf
- Localized excess only 0.011° from the optical position.
- Model: differential rotation $\rightarrow$ magnetic torque $\rightarrow$ particle acceleration.
- IC channel can reach $L_{\gamma, \text{obs}}$

Fermi-LAT Light Curve and TS Evolution



The *Fermi*-LAT light curve is generated in 6-hour bins. The top panel shows an 18-hour moving average, obtained by combining three consecutive bins to highlight the overall temporal behaviour. The middle panel shows the selected 6-hour flux measurements, while the bottom panel gives their corresponding TS values.

Timing and Periodicity Analysis



For the timing analysis, we used a 0.6° radius region of interest. No additional event selection was applied; instead, all events that passed the standard *Fermi*-LAT data filtering criteria were used. We performed the periodicity search using the Rayleigh test implemented in the *gtpsearch* tool. The phase of each event was then calculated using the *Fermi* timing plugin, which uses the TEMPO2 timing package to assign rotational phases to the individual photons [1, 2].