Fermi-LAT Search for Pulsar Wind Nebulae Associated With High-$\dot{E}$ γ-Quiet Pulsars

1. Introduction

The Large Area Telescope (LAT) on board the *Fermi* Gamma-ray Space Telescop has vastly improved the field of γ-ray pulsars.

How many pulsars detected by the LAT.

Most prominently, the LAT Collaboratino rece

- Pulsar Physics

- Pulsars causing a pulsar wind.

- PWNe (high energy IC emission)

- PWNe detected at GeV energies

  - 2PC Off-peak PWNe search
  - TeVCat PWNe search
  - Why we see high Edot pulsars.

- Pulsars not seen by the LAT (γ-quiet pulsars)

- Search for new pulsars. Put some kind of note about how LAT has uniform coverage of all sources, which is a benefit.

- Also put note about how we discovered a source HESS J1616 & HESS J1825 at GeV energies using this method.

- Put note about how there are 17 pulsars with Edot¿1e37 (table 3 in 2PC). Of those, 8 has no gamma-ray pulsations. There are 46 with 10^{36} ¡ Edot ¡ 10^{37}. 19 pulsars with no gamma-ray pulsations (table 4 in 2PC). In total, there are 27 pulsars with $E_d ot > 10^{36}$ with no pulsations (despite thorough search). We search the LAT data for these 27 high Edot pulsars to find new PWNe.

2FGL is (Nolan et al. 2012).

2. Analysis Method

2.1. Pulsar Selection Criteria

Our selection criteria for our PWN search was that to selected high $\dot{E}$ pulsars with no γ-ray pulsations.

We took Table 10 from 2PC [CITATION NEEDED],

We excluded J0537−6910 and J0540−6919. They are in the LMC region which has been detected.

Exclude 3 regiongs with dedicated publications:

1. J1617−5055 (HESS J1616-508)

2. J1838−0655 (HESS J1837-069)

3. J1826−1334 (HESS J1825-137)

Don't include pulsars which have LAT-detected pulsars since publication of 2FGL. Presumably, need to redo analysis in off-peak

1. J1824−2452A

2. J1055−6028

Don't include sources in Romain's PWNe search:

1. J1301-6305 -¿ HESS J1303-631

2. J1813-1749 -¿ HESS J1813-178

2.2. LAT Data Preparation

Analysis results

3.   Discussion

REFERENCES

Nolan, P. L., et al. 2012, ApJS, 199, 31

A.   notes

Benefits:

1. Improved time range (XXX months vs XXX months in 2PC)

2. Improved uppper limit from likelihood test.

3. Better analysis method (search for extended sources, could be more sensitive?) Look for hard-index sources (unlike 2PC).

4. For example, Lande et al 2012 discovered Gamma-ray emission from HESS J1616-508 which is associated with PSR J1617-5055.

5. Note: Table 3 and 4 get upper limits assuming cutoff spectrum, not suitable for PWNe searches. For describing of 2PC flux upper limits, see `https://confluence.slac.stanford.edu/x/U`

Notes/questions:

1. Should we used reprocessed data?

This preprint was prepared with the AAS LATEX macros v5.2.