

Package ‘fermicatsR’

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Title Fermi Large Area Telescope Catalogs

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Description Data from various catalogs of astrophysical gamma-ray sources detected by NASA's Large Area Telescope (The Astrophysical Journal, 697, 1071, 2009 June 1), on board the Fermi gamma-ray satellite. More information on Fermi and its data products is available from the Fermi Science Support Center (<http://fermi.gsfc.nasa.gov/ssc/>).

Depends R ($\geq 3.1.0$)

Suggests ggplot2

License CC0

LazyData true

URL <https://github.com/sazpark/fermicatsR.git>

RoxygenNote 5.0.1

NeedsCompilation no

Author Pablo Saz Parkinson [aut, cre]

Maintainer Pablo Saz Parkinson <sazpark2@gmail.com>

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DF1	<i>1DF Catalog (First D3PO Fermi catalog of gamma-ray source candidates)</i>
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Description

The Denoised, Deconvolved, and Decomposed Fermi Gamma-ray Sky: An application of the D3PO algorithm Selig, M. et al., Astronomy and Astrophysics, 581, 126 (2015).

Usage

DF1

Format

A data frame with 48 variables on 3106 gamma-ray sources.

Details

FITS Filename: catalog_1.fits

Fields

CandidateName Candidate Name

GLON Galactic Longitude, deg.

GLAT Galactic Latitude, deg.

Flux Total flux between 1-100 GeV, photon cm⁻² s⁻¹

Emid1 Contributing energy band 1, T/F, Emin=0.60 GeV, Emid=0.85 GeV, Max=1.20 GeV

Emid2 Contributing energy band 2, T/F, Emin=1.20 GeV, Emid=1.70 GeV, Max=2.40 GeV

Emid3 Contributing energy band 3, T/F, Emin=2.40 GeV, Emid=3.40 GeV, Max=4.80 GeV

Emid4 Contributing energy band 4, T/F, Emin=4.80 GeV, Emid=6.79 GeV, Max=9.60 GeV

Emid5 Contributing energy band 5, T/F, Emin=9.60 GeV, Emid=13.58 GeV, Max=19.20 GeV

Emid6 Contributing energy band 6, T/F, Emin=19.20 GeV, Emid=27.15 GeV, Max=38.40 GeV

Emid7 Contributing energy band 7, T/F, Emin=38.40 GeV, Emid=54.31 GeV, Max=76.80 GeV

Emid8 Contributing energy band 8, T/F, Emin=76.80 GeV, Emid=108.61 GeV, Max=153.60 GeV

Emid9 Contributing energy band 9, T/F, Emin=153.60 GeV, Emid=217.22 GeV, Max=307.20 GeV

Distance1 Distance1, deg.

Association1a Primary association

Association1b Association1b
Association1c Association1c
Distance2 Distance2, deg.
Association2a Association2a
Association2b Association2b
Association2c Association2c
Distance3 Distance3, deg.
Association3a Association3a
Association3b Association3b
Association3c Association3c
Distance4 Distance4, deg.
Association4a Association4a
Association4b Association4b
Association4c Association4c
Chi2_PL Chi-squared (power-law fit), See Equation (2) of Selig et al. (2015)
Chi2_LP Chi-squared (log-parabola fit), See Equation (3) of Selig et al. (2015)
Chi2_EXP Chi-squared (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
Gamma_PL Spectral index (power-law fit), See Equation (2) of Selig et al. (2015)
Unc_Gamma_PL Uncertainty in the spectral index (power-law fit), See Equation (2) of Selig et al. (2015)
Gamma_LP Spectral index (log-parabola fit), See Equation (3) of Selig et al. (2015)
Unc_Gamma_LP Uncertainty in the spectral index (log-parabola fit), See Equation (3) of Selig et al. (2015)
Gamma_EXP Spectral index (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
Unc_Gamma_EXP Uncertainty in the spectral index (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
K_PL Normalization (power-law fit), See Equation (2) of Selig et al. (2015)
Unc_K_PL Uncertainty in the normalization (power-law fit), See Equation (2) of Selig et al. (2015)
K_LP Normalization (log-parabola fit), See Equation (3) of Selig et al. (2015)
Unc_K_LP Uncertainty in the normalization (log-parabola fit), See Equation (3) of Selig et al. (2015)
K_EXP Normalization (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
Unc_K_EXP Uncertainty in the normalization (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
Beta_LP Beta index (log-parabola fit), See Equation (3) of Selig et al. (2015)
Unc_Beta_LP Uncertainty in the Beta index (log-parabola fit), See Equation (3) of Selig et al. (2015)
Ec_EXP Energy cut-off (exponential cut-off fit), See Equation (4) of Selig et al. (2015)
Unc_Ec_EXP Uncertainty in the energy cut-off (exponential cut-off fit), See Equation (4) of Selig et al. (2015)

Source

<http://wwwmpa.mpa-garching.mpg.de/ift/fermi/>

fermicatsR

fermicatsR (v 1.4): A package containing catalogs from the Fermi Large Area Telescope.

Description

Since its launch from the Kennedy Space Center on the 11th of June 2008, the Large Area Telescope (LAT, <https://www-glast.stanford.edu>), on board the Fermi Gamma-ray Space Telescope (formerly GLAST) has been performing an all-sky survey of the gamma-ray sky at energies between 20 MeV and 300 GeV. The LAT Collaboration, consisting of more than 400 scientists at over 90 universities and laboratories in 12 countries, has produced a number of catalogs and lists of gamma-ray sources, at various phases of the mission. The fermicatsR package provides some of these catalogs in the form of the following data sets: FGL0, FGL1, FGL2, FGL3, LAC3_LO, LAC3_HI, FHL1, FHL2, FIG1, and pulsars. For an application of the fermicatsR package, see Saz Parkinson et al., "Classification and Ranking of Fermi LAT Gamma-ray Sources from the 3FGL Catalog using Machine Learning Techniques", The Astrophysical Journal, **820**, 8 (2016).

fermicatsR

The following is a brief description of the data sets available within the fermicatsR package and their corresponding Fermi LAT catalogs/lists.

- FGL0: Fermi LAT Bright Gamma-ray Source List, 205 gamma-ray sources, using 3 months of data [Abdo et al., ApJS, **183**, 46 (2009)]
- FGL1: Fermi LAT First Source Catalog, 1451 gamma-ray sources, using 11 months of data [Abdo et al., ApJS, **188**, 405 (2010)]
- FGL2: Fermi LAT Second Source Catalog, 1873 gamma-ray sources, using 24 months of data [Nolan et al., ApJS, **199**, 31 (2012)]
- FGL3: Fermi LAT Third Source Catalog, 3034 gamma-ray sources, using 48 months of data [Acero et al., ApJS, **218**, 23 (2015)]
- LAC3_LO: Fermi LAT Third Catalog of Active Galactic Nuclei - Low Galactic Latitude ($|\text{GLAT}| < 10$ deg.), 182 sources, using 48 months of data [Ackermann et al., ApJ, **810**, 14 (2015)]
- LAC3_HI: Fermi LAT Third Catalog of Active Galactic Nuclei - High Galactic Latitude ($|\text{GLAT}| > 10$ deg.), 1591 sources, using 48 months of data [Ackermann et al., ApJ, **810**, 14 (2015)]
- FHL1: First Fermi-LAT Catalog of Sources Above 10 GeV, 514 high-energy gamma-ray sources, using 36 months of data [Ackermann et al., ApJS, **209**, 34 (2013)]
- FHL2: The Second Catalog of Hard Fermi-LAT Sources, 360 gamma-ray sources, using 80 months of data [Ackermann et al., ApJS, **222**, 5 (2016)]

- FIG1: The First Fermi-LAT Inner Galaxy point source catalog, 48 gamma-ray sources, using 62 months of data [Ajello et al., ApJ, **819**, 44 (2016)]
- DF1: The First D3PO Fermi catalog of gamma-ray source candidates, 3106 sources, using 6.5 years of data [Selig et al., A&A, **581**, 126 (2015)]
- pulsars: Fermi LAT List of Detected Pulsars [<https://confluence.slac.stanford.edu/x/5Jl6Bg>], 205 gamma-ray pulsars, last updated 2016-02-22

For more details on any of these data sets, type 'help(dataset)' or go to the Fermi Science Support Center (FSSC) web page (<http://fermi.gsfc.nasa.gov/ssc/data/access/>). You can also contact me directly with your questions.

Author(s)

Pablo Saz Parkinson (<sazpark2@gmail.com>)

Examples

```
# Variability index vs Curvature significance of 2FGL sources, color-coded by source class
data(FGL2)
if (require("ggplot2")) {
  qplot(log(Signif_Curve), log(Variability_Index), data = FGL2, color = CLASS1)
}
# Distribution of spindown luminosities of LAT-detected gamma-ray pulsars
data(pulsars)
hist(log10(pulsars$Edot),
  xlab = "Log(Spindown Luminosity) (erg/s)",
  ylab = "Number of pulsars",
  main = "LAT-Detected Gamma-ray Pulsars")
```

FGL0	<i>0FGL Catalog (Fermi Large Area Telescope Bright Gamma-ray Source List)</i>
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Description

Fermi Large Area Telescope Bright Gamma-ray Source List (0FGL). Abdo, A. A. et al., The Astrophysical Journal Supplement Series, 183, 46 (2009).

Usage

FGL0

Format

A data frame with 21 variables on 205 gamma-ray sources.

Details

FITS Filename: gll_psc3month_BSL_v2.fit

Fields

Source_Name 0FGL JHHMM.m+DDMM, constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively

RA Right Ascension, J2000, deg, 3 decimal places

DEC Declination, J2000, deg, 3 decimal places

GLON Galactic Longitude, deg, 3 decimal places

GLAT Galactic Latitude, deg, 3 decimal places

Conf_95_Radius Radius of 95% confidence region, deg, 3 decimal places

Sqrt_TS Square root of likelihood TS from 200 MeV - 100 GeV analysis, used for the TS > 100 cut, 1 decimal place

Flux_100_1000 Flux 100 MeV to 1 GeV (i.e., $\log_{10} E = 2-3$), $10^{-8} \text{ cm}^{-2} \text{ s}^{-1}$, 2 decimal places

Unc_Flux100_1000 1 sigma uncertainty on F_23, same units and precision. A 0 in this column indicates that the entry in the F_23 flux column is an upper limit.

Flux1000_100000 Flux for 1 GeV to 100 GeV (i.e., $\log_{10} E = 3-5$), $10^{-8} \text{ cm}^{-2} \text{ s}^{-1}$, 2 decimal places

Unc_Flux1000_100000 1 sigma uncertainty on F_35, same units and precision.

Variability_Flag T indicates < 1% chance of being a steady source on a weekly timescale

Sqrt_TS23 Square root of TS for the 100 MeV to 1 GeV range, 1 decimal place

Sqrt_TS35 Square root of TS for the 1 GeV to 100 GeV range, 1 decimal place

ASSOC_GAM1 Identification or positional associations with 3EG, EGR, or AGILE sources

ASSOC_GAM2 Identification or positional associations with 3EG, EGR, or AGILE sources

ASSOC_GAM3 Identification or positional associations with 3EG, EGR, or AGILE sources

CLASS1 Class designation for associated source. Capital letters indicate firm identifications; lower-case letters indicate associations: Pulsar (PSR), Pulsar wind nebula (pwn), High-mass X-ray binary (hxb), BL Lac type of blazar (bzb), FSRQ type of blazar (bzq), Uncertain type of blazar (bzu), Radio galaxy (rdg), Globular cluster (glb), Special case - potential association with SNR or PWN (x), Unassociated ().

CLASS2 2nd class designation for associated source

ASSOC1 Name of identified or likely associated source

ASSOC2 Alternate name of identified or likely associated source

Source

<http://heasarc.gsfc.nasa.gov/W3Browse/fermi/fermilbs1.html>

FGL1

*1FGL Catalog (Fermi Large Area Telescope First Source Catalog)***Description**

Fermi Large Area Telescope First Source Catalog (1FGL). Abdo, A. A. et al., The Astrophysical Journal Supplement Series, 188, 405 (2010).

Usage

FGL1

Format

A data frame with 89 variables on 1451 gamma-ray sources.

Details

Initial Release: 14 Jan 2010 Latest Release: gll_psc_v03.fit (9 February 2010)

Fields

Source_Name 1FGL JHHMM.m+DDMM[c], constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively; 'c' indicates that based on the region of the sky the source is considered to be potentially confused with Galactic diffuse emission

RA Right Ascension, J2000, deg, three decimal places

DEC Declination, J2000, deg, three decimal places

GLON Galactic longitude, deg, three decimal places

GLAT Galactic latitude, deg, three decimal places

Conf_68_SemiMajor Semimajor radius of 68% confidence region, deg, three decimal places

Conf_68_SemiMinor Semiminor radius of 68% confidence region, deg, three decimal places

Conf_68_PosAng Position angle of 68% confidence region, deg. east of north, 0 decimal places

Conf_95_SemiMajor Semimajor radius of 95% confidence region, deg, three decimal places

Conf_95_SemiMinor Semiminor radius of 95% confidence region, deg, three decimal places

Conf_95_PosAng Position angle of 95% confidence region, deg. east of north, 0 decimal places

Signif_Avg Significance derived from likelihood TS for 100 MeV\342\200\223100 GeV analysis, one decimal place

Pivot_Energy Energy at which error on differential flux is minimal, in MeV

Flux_density Differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Unc_Flux_Density 1 sigma error on differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Spectral_Index Best-fit power-law slope

Unc_Spectral_Index 1 sigma error on best-fit power-law slope

Flux1000 Integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000 1 sigma error on integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Energy_Flux Energy flux from 100 MeV to 100 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Unc_Energy_Flux 1 sigma error on energy flux from 100 MeV to 100 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Curvature_Index Measure of how spectrum follows power law (currently simple chi-squared)

Flux30_100 Integral flux from 30 to 100 MeV (not filled)

Unc_Flux30_100 1 sigma error on integral flux from 30 to 100 MeV (not filled)

Sqrt_TS30_100 Square root of the TS between 30 and 100 MeV (not filled)

Flux100_300 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux100_300 1 sigma error on integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS100_300 Square root of the TS between 100 to 300 MeV

Flux300_1000 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux300_1000 1 sigma error on integral flux from 300 MeV to 1 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS300_1000 Square root of the TS between 300 MeV to 1 GeV

Flux1000_3000 Integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000_3000 1 sigma error on integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS1000_3000 Square root of the TS between 1 to 3 GeV

Flux3000_10000 Integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux3000_10000 1 sigma error on integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS3000_10000 Square root of the TS between 3 to 10 GeV

Flux10000_100000 Integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux10000_100000 1 sigma error on integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS10000_100000 Square root of the TS between 10 to 100 GeV

Variability_Index Measure of source variability (currently simple chi-squared)

Signif_Peak Source significance in peak interval in sigma units

Flux_Peak Peak integral flux from 100 MeV to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_Peak 1 sigma error on peak integral flux, in $\text{cm}^{-2} \text{s}^{-1}$

Time_Peak Time of center of interval in which peak flux was measured

Peak_Interval Length of interval in which peak flux was measured

Flux_History.1 ... Flux_History.11 Integral flux from 100 MeV to 100 GeV in time interval 1 ... 11, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_History.1 ... Unc_Flux_History.11 Error on the integral flux from 100 MeV to 100 GeV in time interval 1 ... 11, in $\text{cm}^{-2} \text{s}^{-1}$, using the method indicated in **Unc_Flag_History** column and added in quadrature with 3% systematic component.

Unc_Flag_History.1 ... Unc_Flag_History.11 1 if it is half of the difference between the 2 sigma upper limit and the maximum likelihood value given in **Flux_History**; 0 if it is the 1 sigma uncertainty derived from a significant detection in the interval.

- X0FGL_Name** Name of the corresponding 0FGL source, if any
- ASSOC_GAM1** Identification or positional associations with AGILE source
- ASSOC_GAM2** Identification or positional associations with 3EG source
- ASSOC_GAM3** Identification or positional associations with EGR source
- TEVCAT_FLAG** Positional association with a TeVCat source, P for angular size < 40', E for extended, N if no TeV association
- CLASS1** Class designation for most likely association. Capital letters indicate firm identifications; lower-case letters indicate associations: Pulsar (PSR), Pulsar wind nebula (PWN), Supernova remnant (SNR), Globular cluster (GLC), Micro-quasar object (MQO), High-mass binary (HXB), Blazar of the BL Lac type (BZB), Blazar of the FSRQ type (BZQ), Non-blazar active galaxy (AGN), Active galaxy of uncertain type (AGU), Normal galaxy (GAL), Starburst galaxy (SBG), Unassociated source ().
- CLASS2** 2nd class designation for associated source.
- ASSOC1** Name of identified or likely associated source.
- ASSOC2** Alternate name of identified or likely associated source.
- Flags** Binary coding. See Table 4 of 1FGL paper for the definition of the various Analysis Flags.

Source

http://fermi.gsfc.nasa.gov/ssc/data/access/lat/1yr_catalog/

FGL2

2FGL Catalog (Fermi Large Area Telescope Second Source Catalog)

Description

Fermi Large Area Telescope Second Source Catalog (2FGL). Nolan, P. L. et al., The Astrophysical Journal Supplement Series, 199, 31 (2012).

Usage

FGL2

Format

A data frame with 137 variables on 1873 gamma-ray sources.

Details

Initial Release: 11 July 2011 Latest Release: gl_psc_v09.fit (18 May 2015)

Fields

Source_Name 2FGL JHHMM.m+DDMM[c/e], constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1' , respectively; 'c' indicates that based on the region of the sky the source is considered to be potentially confused with Galactic diffuse emission; e indicates a source that was modeled as spatially extended (see Section 3.4 of 2FGL paper)

RAJ2000 Right Ascension, J2000, deg, three decimal places

DEJ2000 Declination, J2000, deg, three decimal places

GLON Galactic longitude, deg, three decimal places

GLAT Galactic latitude, deg, three decimal places

Conf_68_SemiMajor Semimajor radius of 68% confidence region, deg, three decimal places

Conf_68_SemiMinor Semiminor radius of 68% confidence region, deg, three decimal places

Conf_68_PosAng Position angle of 68% confidence region, deg. east of north, 0 decimal places

Conf_95_SemiMajor Semimajor radius of 95% confidence region, deg, three decimal places

Conf_95_SemiMinor Semiminor radius of 95% confidence region, deg, three decimal places

Conf_95_PosAng Position angle of 95% confidence region, deg. east of north, 0 decimal places

Signif_Avg Significance derived from likelihood TS for 100 MeV\342\200\223100 GeV analysis, one decimal place

Pivot_Energy Energy at which error on differential flux is minimal, in MeV

Flux_density Differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Unc_Flux_Density 1 sigma error on differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Spectral_Index Best-fit photon number power-law index. For LogParabola spectra, index at Pivot_Energy; for PLEXPcutoff spectra, low-energy index.

Unc_Spectral_Index 1 sigma error on Spectral_Index

Flux1000 Integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000 1 sigma error on integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Energy_Flux100 Energy flux from 100 MeV to 100 GeV obtained by spectral fitting, in $\text{erg cm}^{-2} \text{s}^{-1}$

Unc_Energy_Flux 1 sigma error on energy flux from 100 MeV to 100 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Signif_Curve Significance (in sigma units) of the fit improvement between power-law and either LogParabola (for ordinary sources) or PLEXPcutoff (for pulsars). A value greater than 4 indicates significant curvature.

SpectrumType Spectral type (PowerLaw, LogParabola, PLEXPcutoff)

beta Curvature parameter (Beta) for LogParabola. NULL for other spectral types

Unc_beta 1 sigma error on Beta for LogParabola. NULL for other spectral types

Cutoff Cutoff energy as $\exp(-E/\text{Cutoff})$ for PLEXPcutoff, in MeV. NULL for other spectral types.

Unc_Cutoff 1 sigma error on cutoff energy for PLEXPcutoff, in MeV. NULL for other spectral types.

PowerLaw_Index Best-fit power-law index. Equal to Spectral_Index if SpectrumType is Power-Law.

Flux30_100 Integral flux from 30 to 100 MeV (not filled)

Unc_Flux30_100 1 sigma error on integral flux from 30 to 100 MeV (not filled)

Sqrt_TS30_100 Square root of the TS between 30 and 100 MeV (not filled)

Flux100_300 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux100_300 1 sigma error on integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS100_300 Square root of the TS between 100 to 300 MeV

Flux300_1000 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux300_1000 1 sigma error on integral flux from 300 MeV to 1 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS300_1000 Square root of the TS between 300 MeV to 1 GeV

Flux1000_3000 Integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000_3000 1 sigma error on integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS1000_3000 Square root of the TS between 1 to 3 GeV

Flux3000_10000 Integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux3000_10000 1 sigma error on integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS3000_10000 Square root of the TS between 3 to 10 GeV

Flux10000_100000 Integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux10000_100000 1 sigma error on integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS10000_100000 Square root of the TS between 10 to 100 GeV

Variability_Index Sum of $2 \times \text{Log}(\text{Likelihood})$ comparison between the flux fitted in 24 time segments and a flat light curve over the full two-year catalog interval. A value greater than 41.64 indicates $< 1\%$ chance of being a steady source.

Signif_Peak Source significance in peak interval in sigma units

Flux_Peak Peak integral flux from 100 MeV to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_Peak 1 sigma error on peak integral flux, in $\text{cm}^{-2} \text{s}^{-1}$

Time_Peak Time of center of interval in which peak flux was measured

Peak_Interval Length of interval in which peak flux was measured

Flux_History.1 ... Flux_History.24 Integral flux from 100 MeV to 100 GeV in time interval 1 ... 24, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_History.1 ... Unc_Flux_History.24 Error on the integral flux from 100 MeV to 100 GeV in time interval 1 ... 24, in $\text{cm}^{-2} \text{s}^{-1}$, using the method indicated in **Unc_Flag_History** column and added in quadrature with 3% systematic component.

Unc_Flag_History.1 ... Unc_Flag_History.24 1 if it is half of the difference between the 2 sigma upper limit and the maximum likelihood value given in **Flux_History**; 0 if it is the 1 sigma uncertainty derived from a significant detection in the interval.

Extended_Source_Name Cross-reference to the ExtendedSources extension for extended sources, if any.

0FGL_Name Name of the corresponding 0FGL source, if any.

1FGL_Name Name of the corresponding 1FGL source, if any.

ASSOC_GAM1 Identification or positional associations with AGILE (1AGL)source

ASSOC_GAM2 Identification or positional associations with 3EG source

ASSOC_GAM3 Identification or positional associations with EGR source

TEVCAT_FLAG Positional association with a TeVCat source, P for angular size < 40', E for extended, N if no TeV association

ASSOC_TEV Name of likely corresponding TeV source from TevCat.

CLASS1 Class designation for most likely association. Capital letters indicate firm identifications; lower-case letters indicate associations: Pulsar, identified by pulsations (PSR), Pulsar, no pulsations seen in LAT yet (psr), Pulsar wind nebula (PWN), Supernova remnant (SNR), Supernova remnant/pulsar wind nebula (spp), Globular cluster (glc), High-mass binary (HMB), Nova (NOV), Blazar of the BL Lac type (BZB), Blazar of the FSRQ type (BZQ), Non-blazar active galaxy (AGN), Radio galaxy (RDG), Seyfert galaxy (SEY), Active galaxy of uncertain type (AGU), Normal galaxy (GAL), Starburst galaxy (sbg), Unassociated source ().

CLASS2 2nd class designation for associated source.

ASSOC1 Name of identified or likely associated source.

ASSOC2 Alternate name of identified or likely associated source.

Flags Binary coding. See Table 3 of 2FGL paper for the definition of the various Analysis Flags.

Source

http://fermi.gsfc.nasa.gov/ssc/data/access/lat/2yr_catalog/

FGL3

3FGL Catalog (Fermi Large Area Telescope Third Source Catalog)

Description

Fermi Large Area Telescope Second Source Catalog (3FGL). Acero, F. et al., The Astrophysical Journal Supplement Series, 218, 23 (2015).

Usage

FGL3

Format

A data frame with 224 variables on 3034 gamma-ray sources.

Details

Initial Release: 9 January 2015 Latest Release: gll_psc_v16.fit (18 May 2015)

Fields

Source_Name 3FGL JHHMM.m+DDMM[c/e], constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively; 'c' indicates that based on the region of the sky the source is considered to be potentially confused with Galactic diffuse emission; e indicates a source that was modeled as spatially extended (see Section 3.4 of 2FGL paper)

RAJ2000 Right Ascension, J2000, deg, three decimal places

DEJ2000 Declination, J2000, deg, three decimal places

GLON Galactic longitude, deg, three decimal places

GLAT Galactic latitude, deg, three decimal places

Conf_68_SemiMajor Semimajor radius of 68% confidence region, deg, three decimal places

Conf_68_SemiMinor Semiminor radius of 68% confidence region, deg, three decimal places

Conf_68_PosAng Position angle of 68% confidence region, deg. east of north, 0 decimal places

Conf_95_SemiMajor Semimajor radius of 95% confidence region, deg, three decimal places

Conf_95_SemiMinor Semiminor radius of 95% confidence region, deg, three decimal places

Conf_95_PosAng Position angle of 95% confidence region, deg. east of north, 0 decimal places

ROI_num ROI number (cross-reference to ROIs extension)

Signif_Avg Source significance (in sigma units) derived from likelihood TS for 100 MeV\342\200\223300 GeV analysis, one decimal place

Pivot_Energy Energy at which error on differential flux is minimal, in MeV

Flux_density Differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Unc_Flux_Density 1 sigma error on differential flux at Pivot_Energy, in $\text{cm}^{-2} \text{MeV}^{-1} \text{s}^{-1}$

Spectral_Index Best-fit photon number power-law index: For LogParabola spectra, index at Pivot_Energy; for PLEXPcutoff spectra, low-energy index.

Unc_Spectral_Index 1 sigma error on Spectral_Index

Flux1000 Integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000 1 sigma error on integral flux from 1 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Energy_Flux100 Energy flux from 100 MeV to 100 GeV obtained by spectral fitting, in $\text{erg cm}^{-2} \text{s}^{-1}$

Unc_Energy_Flux 1 sigma error on energy flux from 100 MeV to 100 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Signif_Curve Significance (in sigma units) of the fit improvement between power-law and either LogParabola (for ordinary sources) or PLEXPcutoff (for pulsars). A value greater than 4 indicates significant curvature.

SpectrumType Spectral type (PowerLaw, LogParabola, PLEXPcutoff, PLSuperExpCutoff)

beta Curvature parameter (Beta) for LogParabola. NULL for other spectral types

Unc_beta 1 sigma error on Beta for LogParabola. NULL for other spectral types

Cutoff Cutoff energy (E_c for equation 2 of 3FGL paper) for PL(Super)ExpCutoff, in MeV. NULL for other spectral types.

Unc_Cutoff 1 sigma error on cutoff energy for PLEXPcutoff, in MeV. NULL for other spectral types.

Exp_Index Exponential index (b of Equation 2 of 3FGL paper) for PLSuperExpCutoff. NULL for other spectral types

PowerLaw_Index Best-fit power-law index. Equal to Spectral_Index if SpectrumType is Power-Law.

Flux30_100 Integral flux from 30 to 100 MeV (not filled)

Unc_Flux30_100 1 sigma error on integral flux from 30 to 100 MeV (not filled)

nuFnu30_100 Spectral energy distribution between 30 and 100 MeV (not filled)

Sqrt_TS30_100 Square root of the TS between 30 and 100 MeV (not filled)

Flux100_300 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux100_300 1 sigma error on integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

nuFnu100_300 Spectral energy distribution between 100 and 300 MeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Sqrt_TS100_300 Square root of the TS between 100 to 300 MeV

Flux300_1000 Integral flux from 100 to 300 MeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux300_1000 1 sigma error on integral flux from 300 MeV to 1 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

nuFnu300_1000 Spectral energy distribution between 300 and 1 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Sqrt_TS300_1000 Square root of the TS between 300 MeV to 1 GeV

Flux1000_3000 Integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux1000_3000 1 sigma error on integral flux from 1 to 3 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

nuFnu1000_3000 Spectral energy distribution between 1 and 3 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Sqrt_TS1000_3000 Square root of the TS between 1 to 3 GeV

Flux3000_10000 Integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux3000_10000 1 sigma error on integral flux from 3 to 10 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

nuFnu3000_10000 Spectral energy distribution between 3 and 10 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Sqrt_TS3000_10000 Square root of the TS between 3 to 10 GeV

Flux10000_100000 Integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux10000_100000 1 sigma error on integral flux from 10 to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

nuFnu10000_100000 Spectral energy distribution between 10 and 100 GeV, in $\text{erg cm}^{-2} \text{s}^{-1}$

Sqrt_TS10000_100000 Square root of the TS between 10 to 100 GeV

Variability_Index Sum of $2 \times \text{Log}(\text{Likelihood})$ comparison between the flux fitted in 48 time segments and the average flux over the full catalog interval. A value greater than 72.44 over 48 intervals indicates $< 1\%$ chance of being a steady source.

Signif_Peak Source significance in peak interval in sigma units

Flux_Peak Peak integral flux from 100 MeV to 100 GeV, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_Peak 1 sigma error on peak integral flux, in $\text{cm}^{-2} \text{s}^{-1}$

Time_Peak Time of center of interval in which peak flux was measured, in MET s

Peak_Interval Length of interval in which peak flux was measured

Flux_History.1 ... Flux_History.48 Integral flux from 100 MeV to 100 GeV in time interval 1 ... 48, in $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux_History.1 ... Unc_Flux_History.48 Error on the integral flux from 100 MeV to 100 GeV in time interval 1 ... 48, in $\text{cm}^{-2} \text{s}^{-1}$, using the method indicated in Unc_Flag_History column and added in quadrature with 3% systematic component.

Unc_Flag_History.1 ... Unc_Flag_History.48 1 if it is half of the difference between the 2 sigma upper limit and the maximum likelihood value given in Flux_History; 0 if it is the 1 sigma uncertainty derived from a significant detection in the interval.

Extended_Source_Name Cross-reference to the ExtendedSources extension for extended sources, if any.

X0FGL_Name Name of the corresponding 0FGL source, if any.

X1FGL Name Name of the corresponding 1FGL source, if any.

X2FGL Name Name of the corresponding 2FGL source, if any.

X1FHL Name Name of the corresponding 1FHL source, if any.

ASSOC_GAM1 Identification or positional associations with AGILE (1AGL)source

ASSOC_GAM2 Identification or positional associations with 3EG source

ASSOC_GAM3 Identification or positional associations with EGR source

TEVCAT_FLAG Positional association with a TeVCat source, P for angular size $< 40'$, E for extended, N if no TeV association

ASSOC_TEV Name of likely corresponding TeV source from TevCat.

CLASS1 Class designation for most likely association. Capital letters indicate firm identifications; lower-case letters indicate associations: Pulsar, identified by pulsations (PSR), Pulsar, no pulsations seen in LAT yet (psr), Pulsar wind nebula (PWN), Supernova remnant (SNR), Supernova remnant/pulsar wind nebula (spp), Globular cluster (glc), High-mass binary (HMB), Binary (BIN), Nova (NOV), Star-forming region (SFR), Compact Steep Spectrum Quasar (css), Blazar of the BL Lac type (BLL), Blazar of the FSRQ type (FSRQ), Non-blazar active galaxy (AGN), Radio galaxy (RDG), Seyfert galaxy (SEY), Blazar candidate of uncertain type (BCU), Normal galaxy (GAL), Starburst galaxy (sbg), Narrow line Seyfert 1 (NLSY1), Soft spectrum radio quasar (ssrq), Unassociated source ().

CLASS2 2nd class designation for associated source.

ASSOC1 Name of identified or likely associated source.

ASSOC2 Alternate name of identified or likely associated source.

Flags Binary coding. See Table 3 of 3FGL paper for the definition of the various Analysis Flags.

Source

http://fermi.gsfc.nasa.gov/ssc/data/access/lat/4yr_catalog/

FHL1

*1FHL Catalog (First Fermi-LAT Catalog of Sources Above 10 GeV)***Description**

The First Fermi-LAT Catalog of Sources Above 10 GeV (1FHL). Ackermann, M. et al., The Astrophysical Journal Supplement Series, 209, 34 (2013). FITS Filename: gll_psch_v07.fit, released 29 July 2013.

Usage

FHL1

Format

A data frame with 39 variables on 514 sources.

Fields

Source_Name 1FHL JHHMM.m+DDMM, constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively

RAJ2000 Right Ascension, J2000

DEJ2000 Declination, J2000

GLON Galactic longitude, deg.

GLAT Galactic latitude, deg.

Conf_95_SemiMajor Long radius of error ellipse at 95% confidence level

Conf_95_SemiMinor Short radius of error ellipse at 95% confidence level

Conf_95_PosAng Position angle of the 95% long axis from celestial north, positive toward increasing RA (eastward)

Signif_Avg Source significance in sigma units (derived from TS)

Pivot_Energy Energy at which error on differential flux is minimal, in GeV

Flux_Density Differential flux at Pivot_Energy, $\text{cm}^{-2} \text{GeV}^{-1} \text{s}^{-1}$

Unc_Flux_Density 1 sigma error on differential flux at Pivot_Energy, $\text{cm}^{-2} \text{GeV}^{-1} \text{s}^{-1}$

Spectral_Index Best fit photon number power-law index

Unc_Spectral_Index 1 sigma error on Spectral_Index

Flux Integral photon flux from 10 to 500 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux 1 sigma error on integral photon flux from 10 to 500 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Energy_Flux Energy flux from 10 to 500 GeV obtained by spectral fitting, $\text{erg cm}^{-2} \text{s}^{-1}$

Unc_Energy_Flux 1 sigma error on energy flux from 10 to 500 GeV, $\text{erg cm}^{-2} \text{s}^{-1}$

Flux10_30GeV Integral flux from 10 to 30 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux10_30GeV.1 (lower) 1 sigma error on integral flux from 10 to 30 GeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux10_30GeV.2 (upper) 1 sigma error on integral flux from 10 to 30 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS10_30GeV Square root of Test Statistic between 10 and 30 GeV

Flux30_100GeV Integral flux from 30 to 100 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux30_100GeV.1 (lower) 1 sigma error on integral flux from 30 to 100 GeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux30_100GeV.2 (upper) 1 sigma error on integral flux from 30 to 100 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS30_100GeV Square root of Test Statistic between 30 and 100 GeV

Flux100_500GeV Integral flux from 100 to 500 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux100_500GeV.1 (lower) 1 sigma error on integral flux from 100 to 500 GeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux100_500GeV.2 (upper) 1 sigma error on integral flux from 100 to 500 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS100_500GeV Square root of Test Statistic between 100 and 500 GeV

Variability_BayesBlocks Number of Bayesian Blocks found (1 for non-variable)

Extended_Source_Name Cross-reference to the Extended Sources extension for extended sources, if any

ASSOC_GAM Name of corresponding source in gamma-ray catalog, if any

TEVCAT_FLAG P if positional association with non-extended source in TeVCat, E if associated with an extended source in TeVCat, N if no TeV association

ASSOC_TEV Name of TeV association, if any

CLASS1 Class designation for most likely association. Capital letters indicate firm identifications; lower-case letters indicate associations: Blazar of the BL Lac type (BZB), Blazar of the FSRQ type (BZQ), Active galaxy of uncertain type (AGU), Pulsar, identified by pulsations above 10 GeV (HPSR), Pulsar, identified by pulsations in LAT, excluding HPSR (PSR), Pulsar, no pulsations seen in LAT yet (psr), Supernova remnant (SNR), Pulsar wind nebula (PWN), Unclear whether SNR or PWN (spp), Radio galaxy (RDG), High-mass binary (HMB), Normal galaxy (GAL), Star forming region (SFR), LBV star (lbv), Unassociated source ().

CLASS2 Class designation for alternate association, if any

ASSOC1 Name of identified or most likely associated source

ASSOC2 Name of alternate association, if any

Source

<http://fermi.gsfc.nasa.gov/ssc/data/access/lat/1FHL/>

FHL2

*2FHL Catalog (Second Catalog of Hard Fermi-LAT Sources)***Description**

The Second Catalog of Hard Fermi-LAT Sources (2FHL). Ackermann, M. et al., The Astrophysical Journal Supplement Series, 222, 5 (2016). FITS Filename: gl_psch_v08.fits, released 16 Sept 2015.

Usage

FHL2

Format

A data frame with 42 variables on 360 sources.

Fields

Source_Name 2FHL JHHMM.m+DDMM, constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively. A Source_Name ending with "e" indicates an extended source.

RAJ2000 Right Ascension, J2000

DEJ2000 Declination, J2000

GLON Galactic longitude, deg.

GLAT Galactic latitude, deg.

Pos_err_68 Position uncertainty at 68% confidence level

TS Test Statistic

Spectral_Index Best fit photon number power-law index

Unc_Spectral_Index 1 sigma error on Spectral_Index

Intr_Spectral_Index_D11 Intrinsic spectral index computed using the Dominguez et al. (2011b) EBL model

Unc_Intr_Spectral_Index_D11 1 sigma uncertainty on the intrinsic spectral index computed using the Dominguez et al. (2011b) EBL model

Intr_Spectral_Index_G12 Intrinsic spectral index computed using the Gilmore et al. (2012) EBL model

Unc_Intr_Spectral_Index_G12 1 sigma uncertainty on the intrinsic spectral index computed using the Gilmore et al. (2012) EBL model

Flux50 Integral photon flux from 50 GeV to 2 TeV, photon cm⁻² s⁻¹

Unc_Flux50 1 sigma uncertainty on integral flux from 50 GeV to 2 TeV, photon cm⁻² s⁻¹

Energy_Flux50 Energy flux from 50 GeV to 2 TeV, erg cm⁻² s⁻¹

Unc_Energy_Flux50 1 sigma error on energy flux from 50 GeV to 2 TeV, erg cm⁻² s⁻¹

Flux50_171GeV Integral photon flux from 50 to 171 GeV, cm⁻² s⁻¹

Unc_Flux50_171GeV.1 (lower) 1 sigma error on integral photon flux from 50 to 171 GeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux50_171GeV.2 (upper) 1 sigma error on integral photon flux from 50 to 171 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS50_171GeV Square root of Test Statistic between 50 and 171 GeV

Flux171_585GeV Integral photon flux from 171 to 585 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux171_585GeV.1 (lower) 1 sigma error on integral photon flux from 171 to 585 GeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux171_585GeV.2 (upper) 1 sigma error on integral photon flux from 171 to 585 GeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS171_585GeV Square root of Test Statistic between 171 and 585 GeV

Flux585_2000GeV Integral photon flux from 585 GeV to 2 TeV, $\text{cm}^{-2} \text{s}^{-1}$

Unc_Flux585_2000GeV.1 (lower) 1 sigma error on integral photon flux from 585 GeV to 2 TeV, $\text{cm}^{-2} \text{s}^{-1}$, set to NaN if 1 sigma interval contains 0

Unc_Flux585_2000GeV.2 (upper) 1 sigma error on integral photon flux from 585 GeV to 2 TeV, $\text{cm}^{-2} \text{s}^{-1}$

Sqrt_TS585_2000GeV Square root of Test Statistic between 585 GeV and 2 TeV

Npred Predicted number of photons from the source

HEP_Energy Highest photon energy, GeV

HEP_Prob Probability that the HEP is coming from the source, ≥ 0.85

ROI Region of interest number

ASSOC Name of the most likely associated source

ASSOC_PROB_BAY Probability of association from the Bayesian method

ASSOC_PROB_LR Probability of association from the likelihood ratio method

CLASS Class designation for most likely association. Capital letters indicate firm identifications; lower-case letters indicate associations: Pulsar (psr), Pulsar wind nebula (pwn), Supernova remnant (snr), Supernova remnant/Pulsar wind nebula (spp), High-mass binary (hmb), Binary (bin), Star-forming region (sfr), BL Lac type of blazar (bll), BL Lac type of blazar with prominent galaxy emission (bll-g), FSRQ type of blazar (fsrq), Non-blazar active galaxy (agn), Radio galaxy (rdg), Radio galaxy/BL Lac (rdg/bll), Blazar candidate of uncertain type I (bcu I), Blazar candidate of uncertain type II (bcu II), Blazar candidate of uncertain type III (bcu III), Normal galaxy, or part (gal), Galaxy cluster (galclu), Unassociated source ().

Redshift Redshift (when available) of the most likely associated source

NuPeak_obs Observed Synchrotron peak frequency, Hz

X3FGL_Name Name of the most likely associated source in 3FGL

X1FHL_Name Name of the most likely associated source in the 1FHL

TeVCat_Name Name of the most likely associated source in the TeVCat

Source

<http://fermi.gsfc.nasa.gov/ssc/data/access/lat/2FHL/>

FIG1

*1FIG (First Fermi-LAT Inner Galaxy point source Catalog)***Description**

First Fermi-LAT Inner Galaxy point source Catalog (1FIG). Ajello, M. et al., The Astrophysical Journal, 819, 44 (2016).

Usage

FIG1

Format

A data frame with 31 variables on 48 gamma-ray sources.

Details

Results from Table 3 and Table 7 of the journal article.

Fields

Source_Name 1FIG JHHMM.m+DDMM, constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively

GLON Galactic Longitude, degrees

GLAT Galactic Latitude, degrees

dTH Deltatheta, 95% confidence region, deg

TS Test Statistic

F_PSR_INT 1-100 GeV flux, Pulsars Intensity-scaled, 10^{-9} ph cm $^{-2}$ s $^{-1}$

F_PSR_IND 1-100 GeV flux, Pulsars Index-scaled, 10^{-9} ph cm $^{-2}$ s $^{-1}$

F_OB_INT 1-100 GeV flux, OBstars Intensity-scaled, 10^{-9} ph cm $^{-2}$ s $^{-1}$

F_OB_IND 1-100 GeV flux, OBstars Index-scaled, 10^{-9} ph cm $^{-2}$ s $^{-1}$

TYPE Spectral type, PowerLaw (PL) or LogParabola (LP)

A_PSR_INT alpha, Pulsars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha} - \beta \log(E/E_b)$

UNC_A_PSR_INT uncertainty in alpha, Pulsars Intensity-scaled

B_PSR_INT beta, Pulsars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha} - \beta \log(E/E_b)$

UNC_B_PSR_INT uncertainty in beta, Pulsars Intensity-scaled

EB_PSR_INT Eb, Pulsars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha} - \beta \log(E/E_b)$

A_PSR_IND alpha, Pulsars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha} - \beta \log(E/E_b)$

UNC_A_PSR_IND uncertainty in alpha, Pulsars Index-scaled

B_PSR_IND beta, Pulsars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha} - \beta \log(E/E_b)$

UNC_B_PSR_IND uncertainty in beta, Pulsars Index-scaled
EB_PSR_IND Eb, Pulsars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
A_OB_INT alpha, OBstars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
UNC_A_OB_INT uncertainty in alpha, OBstars Intensity-scaled
B_OB_INT beta, OBstars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
UNC_B_OB_INT uncertainty in beta, OBstars Intensity-scaled
EB_OB_INT Eb, OBstars Intensity-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
A_OB_IND alpha, OBstars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
UNC_A_OB_IND uncertainty in alpha, OBstars Index-scaled
B_OB_IND beta, OBstars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
UNC_B_OB_IND uncertainty in beta, OBstars Index-scaled
EB_OB_IND Eb, OBstars Index-scaled, for spectral model $dN/dE \sim (E/E_b)^{-\alpha - \beta \log(E/E_b)}$
ASSOC_3FGL 3FGL association

Source

<http://adsabs.harvard.edu/abs/2016ApJ...819...44A>

LAC3_HI

3LAC_HI (Third Catalog of Active Galactic Nuclei Detected by the Fermi Large Area Telescope - High Galactic Latitude)

Description

Third Catalog of Active Galactic Nuclei (3LAC). Ackermann, M. et al., The Astrophysical Journal, 810, 14 (2015).

Usage

LAC3_HI

Format

A data frame with 26 variables on 1591 gamma-ray sources.

Details

High Galactic Latitude ($|GLAT| > 10$ deg.) Sources.

Fields

Source_Name 1FIG JHHMM.m+DDMM, constructed according to IAU Specifications for Nomenclature; m is decimal minutes of R.A.; in the name R.A. and decl. are truncated at 0.1 decimal minutes and 1', respectively

GLON Galactic Longitude, degrees

GLAT Galactic Latitude, degrees

ASSOC_3FGL 3FGL Source Name (JHHMM.m+DDMM)

VHE Display this very-high-energy AGN data (table10)

Cln Source in Clean sample: Y=Yes, N=No

CName Name of the counterpart source

RAJ2000 Radio counterpart right Ascension (J2000)

DEJ2000 Radio counterpart declination (J2000)

Sep Angular separation with counterpart source, deg.

PosErr 95% error radius, deg.

SpCl Optical class (G1)

SEDCI SED class

lognu Log frequency of observer-frame position of synchrotron peak (NupSyn-Meas)

lognuRf Log frequency of rest-frame position of synchrotron peak (NupSyn-Rf)

z Redshift

Prob Bayesian probability

LR.RG Likelihood Ratio reliability for Radio-gamma-ray association

LR.XGP Likelihood Ratio reliability for X-ray-gamma-ray association

logCpt Compton Dominance in log scale

FRad Radio flux

n_FRad Flag on FRad

FX X-ray flux; units of $1e-13 \text{ erg/cm}^2/\text{s}$

Vmag1 USNO V band magnitude

Vmag2 SDSS V band magnitude

ARO Rest frame, broadband radio-optical spectral index

AOX Rest frame, broadband optical-X-ray spectral index

Source

<http://adsabs.harvard.edu/abs/2015ApJ...810...14A>

LAC3_LO	<i>3LAC_LO (Third Catalog of Active Galactic Nuclei Detected by the Fermi Large Area Telescope - Low Galactic Latitude)</i>
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Description

Third Catalog of Active Galactic Nuclei (3LAC). Ackermann, M. et al., The Astrophysical Journal, 810, 14 (2015).

Usage

LAC3_LO

Format

A data frame with 20 variables on 182 gamma-ray sources.

Details

Low Galactic Latitude ($|GLAT| < 10$ deg.) Sources.

Fields

GLON Galactic Longitude, degrees
GLAT Galactic Latitude, degrees
ASSOC_3FGL 3FGL Source Name (JHHMM.m+DDMM)
VHE Display this very-high-energy AGN data (table10)
CName Name of the counterpart source
RAJ2000 Radio counterpart right Ascension (J2000)
DEJ2000 Radio counterpart declination (J2000)
Sep Angular separation with counterpart source, deg.
PosErr 95% error radius, deg.
SpCl Optical class (G1)
SEDCI SED class
lognu Log frequency of observer-frame position of synchrotron peak (NupSyn-Meas)
lognuRf Log frequency of rest-frame position of synchrotron peak (NupSyn-Rf)
z Redshift
Prob Bayesian probability
LR.RG Likelihood Ratio reliability for Radio-gamma-ray association
FRad Radio flux
n_FRad Flag on FRad
FX X-ray flux; units of $1e-13 \text{ erg/cm}^2/\text{s}$
LR.XG Likelihood Ratio reliability for X-ray-gamma-ray association

Source

<http://adsabs.harvard.edu/abs/2015ApJ...810...14A>

pulsars	<i>pulsars (Public List of LAT-Detected Gamma-Ray Pulsars)</i>
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Description

Fermi Large Area Telescope List of Detected Pulsars <https://confluence.slac.stanford.edu/display/GLAMCOG/Public+List+of+LAT-Detected+Gamma-Ray+Pulsars>

Usage

pulsars

Format

A data frame with 8 variables on 205 gamma-ray pulsars:

Details

Last Updated: 2016-02-22

Fields

PSR Pulsar name, PSR JHHMM+DDMM, constructed using the RA and Dec

RAJ_deg Right Ascension, J2000, degrees

DECJ_deg Declination, J2000, degrees

P_ms Period, milliseconds

Edot Spin-down luminosity, erg/s

Codes b=Pulsar is in a binary system, e=Pulsar was detected in gamma rays by EGRET/COMPTEL, g=Discovered in LAT gamma-ray data, m=Millisecond pulsar, p=Pulsar was discovered by the PSC, r=Discovered in the radio and/or Gamma-ray pulsations detected using the radio ephemeris, u=Discovered using a Fermi-LAT seed position, x=Discovered in the x-ray and/or Gamma-ray pulsations detected using the X-ray ephemeris.

Refs References (see web page for details)

date_public Date made public (all gamma-ray pulsars announced prior to 2016 are listed as being announced 2014-11-06)

Source

<https://confluence.slac.stanford.edu/display/GLAMCOG/Public+List+of+LAT-Detected+Gamma-Ray+Pulsars>

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