



Fermi

Gamma-ray Space Telescope

Fermi LAT

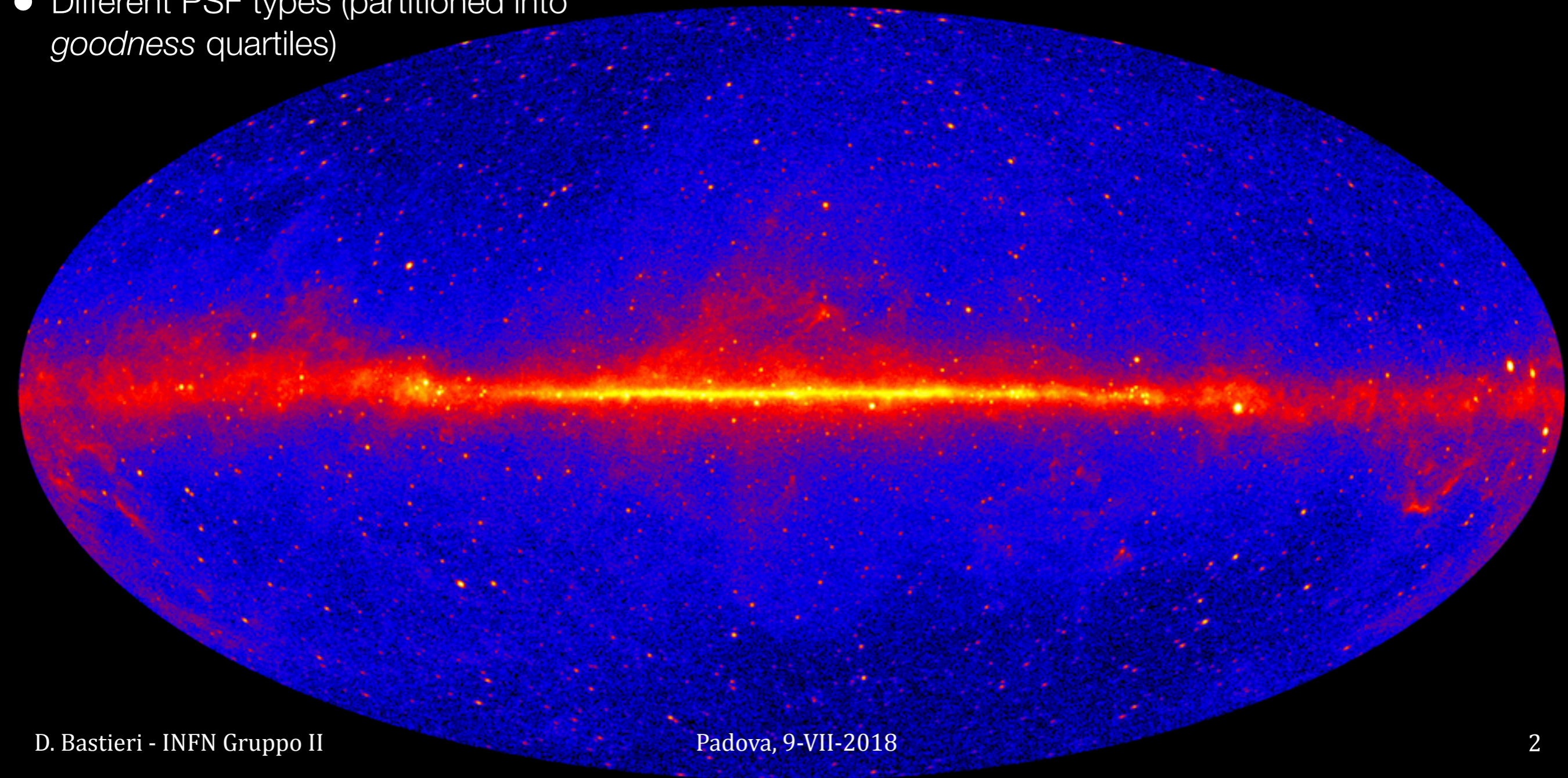
—≡≡ Gruppo 2 ≡≡—

Denis Bastieri
Eugenio Bottacini
Frank Cao
Sina Chen
Alessandro De Angelis
Matt Pei
Riccardo Rando

New catalog (4FGL) available soon, with many improvements with respect to the previous catalog (3FGL):

- 8 years of Pass 8 data
 - more data (3FGL: 4 years)
 - improved *Instrument Response Functions* (3FGL: Pass 7rep)
- Energy range extended: 100 MeV – 1 TeV
 - 3FGL: 100 MeV – 300 GeV
- Different PSF types (partitioned into *goodness* quartiles)

- Energy dependance of *Earth's limb* angular cuts taken into account
- Improved interstellar emission model (in progress)
 - source direction will be recalculated
- Weighted log(likelihood) taking into account also energy dispersion
- Improved spectral parameters
- FL8Y list (~5500 sources) made public on January 3 (3FGL: ~3000 sources)



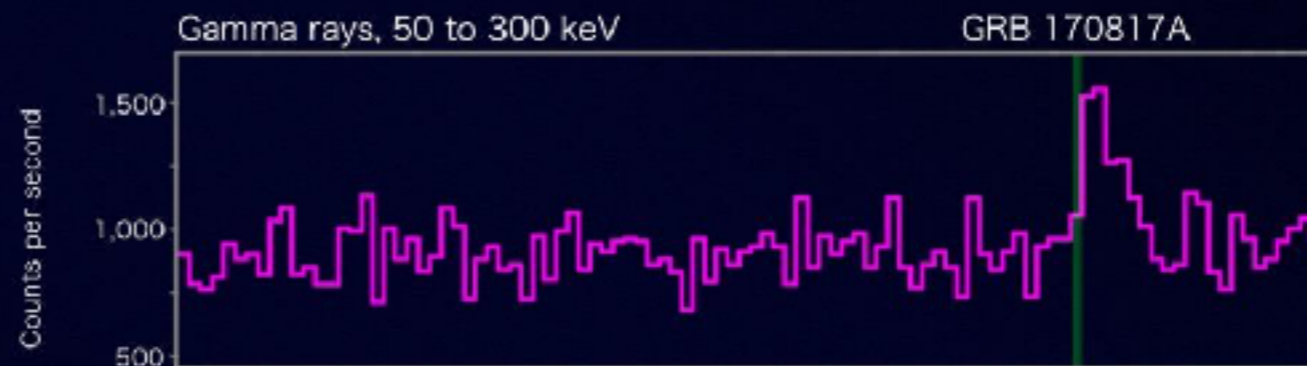
INTEGRAL's Picture of the Month

Fermi

Reported 16 seconds after detection

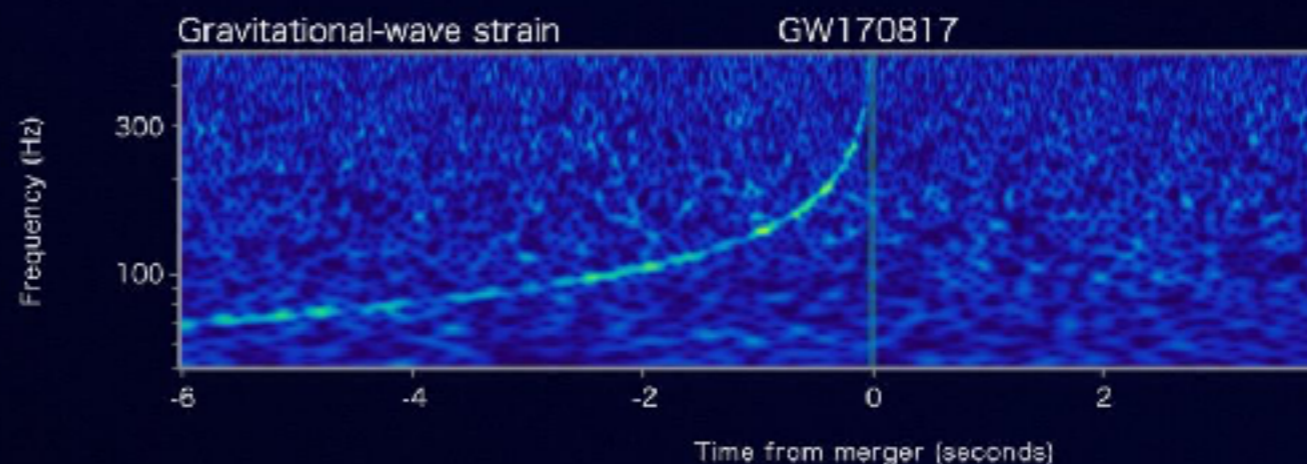


Fermi report: 16 seconds after onset!



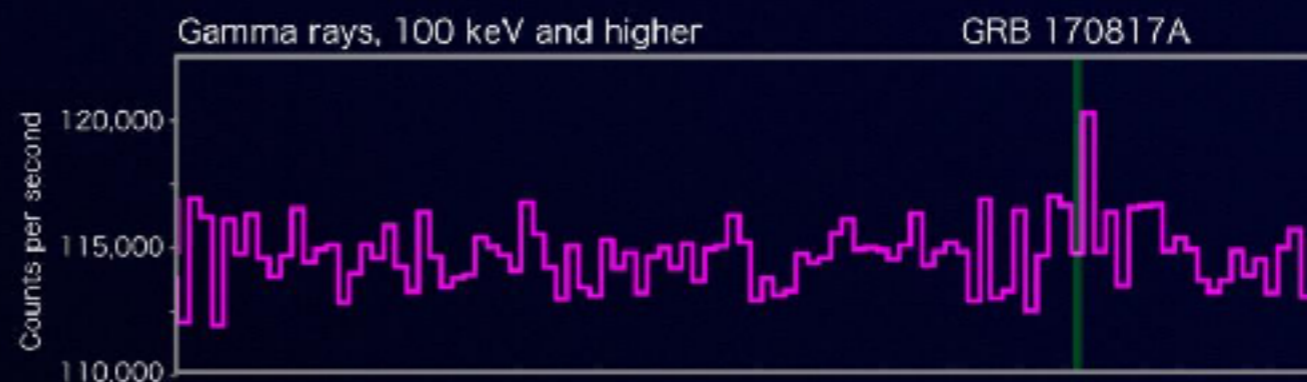
LIGO-Virgo

Reported 27 minutes after detection



INTEGRAL

Reported 66 minutes after detection



Fermi was the first detector to suggest a counterpart to GW170817

... not only partners with GW! also neutrinos!



TITLE: GCN CIRCULAR
 NUMBER: 21916
 SUBJECT: IceCube-170922A - IceCube observation of a high-energy neutrino candidate event
 DATE: 17/09/23 01:09:

IceCube: Sept. 23, 2017

First-time detection of VHE gamma rays by MAGIC from a direction consistent with the recent EHE neutrino event IceCube-170922A

ATel #10817; *Razmik Mirzoyan for the MAGIC Collaboration*
 on 4 Oct 2017; 17:17 UT

Credential Certification: *Razmik Mirzoyan (Razmik.Mirzoyan@icecube.wisc.edu)*

Subjects: Optical, Gamma Ray, >GeV, TeV, VHE, UHE, Neutrinos, AGN

**MAGIC:
Oct. 4, 2017**

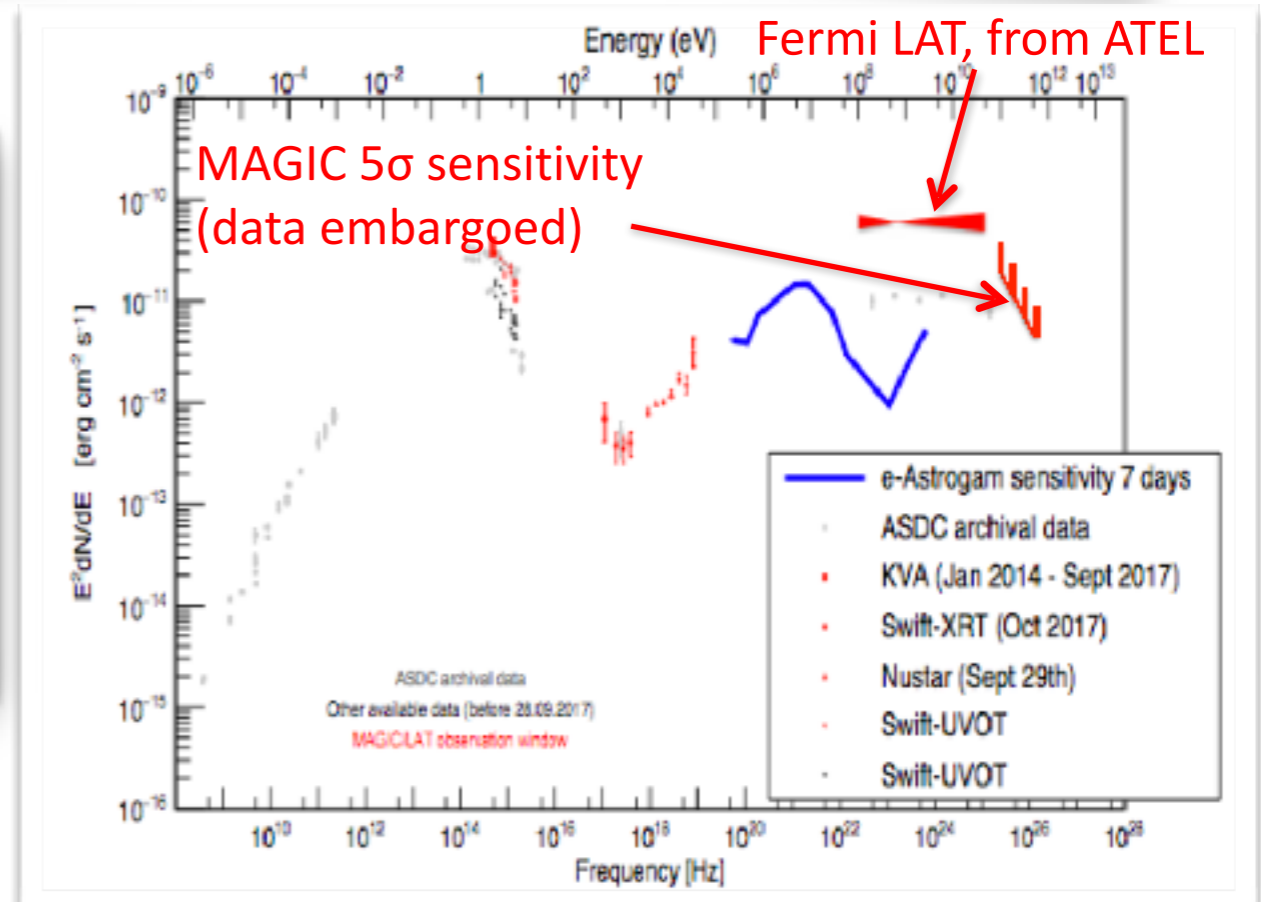
Fermi-LAT detection of increased gamma-ray activity of TXS 0506+056, located inside the IceCube-170922A error region.

ATel #10791; *Yasuyuki T. Tanaka (Hiroshima University), Sara Buson (NASA/GSFC), Daniel Kocevski (NASA/MSFC) on behalf of the Fermi-LAT collaboration*
 on 28 Sep 2017; 10:10 UT
 Credential Certification: *David J. Thompson (David.J.Thompson@nasa.gov)*

Fermi: Sept. 28, 2017

Referred to by ATel #: 10792, 10794, 10799, 10801, 10817, 10830, 10831, 10833, 10838, 10840, 10844, 10845, 10861, 10890, 10942, 11419, 11430, 11489

Fermi was the first detector to suggest a counterpart to IceCube-170922A





- Catalog “4FGL” is a huge effort by most Fermi collaborators
- Fermi is an ideal partner for multi-wavelength, multi-observatory, multi-messenger astronomy (M³Astronomy)
- R. Rando is coordinating the 10-year instrument paper
- Looking also at the future and lower energies

Astronomy & Astrophysics manuscript
July 3, 2018

**MAGIC + Fermi (Bastieri) + many others
Accepted by A&A**

**Multi-wavelength characterization of the blazar S5 0716+714 during
an unprecedented outburst phase**

Probing narrow-line Seyfert 1 galaxies in the southern hemisphere

S. Chen^{1,2,3} *, M. Berton^{1,4}, G. La Mura¹, E. Congiu^{1,4}, V. Cracco¹,
L. Foschini⁴, J.H. Fan², S. Ciroi^{1,5}, P. Rafanelli¹, and D. Bastieri^{3,6}

**Chen ... Bastieri
Accepted by A&A**

**Machine Learning on Efficient Event Reconstruction for
a Nano-satellite Mission**

Haitao Cao^{*,1,2} · Denis Bastieri^{3,4} ·
Riccardo Rando^{3,5} · Giorgio Urso³ ·
Gaoyong Luo⁶ · Alessandro Paccagnella¹

**Cao, Bastieri, Rando ...
Submitted to ExpAstro**



Denis Bastieri	PA	60%
E. Bottacini	RTD-B	50%
Cao Haitao (Frank)	PhD	100%
Chen Sina	PhD	100%
A. De Angelis	PO	20%
Barbara Donaggio	PhD (sick leave)	(100%)
Pei Zhiyuan (Matt)	PhD 1° year	100%
Riccardo Rando	RU	50%
7		4.8 FTE

Missioni Estere

Coll. low energies (US + East Asia) 2 missioni	3.2 k€
Meeting Analysis US 3 missioni	7.2 k€
Coll. meeting SLAC 4 missioni	9.6 k€
Turno ISOC	3.6 k€

Missioni Interne

Riunioni coll. italiana	4 k€
Consumo (metabolismo)	3 k€
Inventariabile (server)	3 k€
TOTALE	33.6

Servizio calcolo: ordinaria manutenzione < 1 mese/uomo