



# Fermi

Gamma-ray Space Telescope

## WP4: *Fermi*-LAT DATA ANALYSIS

Melissa Pesce-Rollins

Sara Cutini

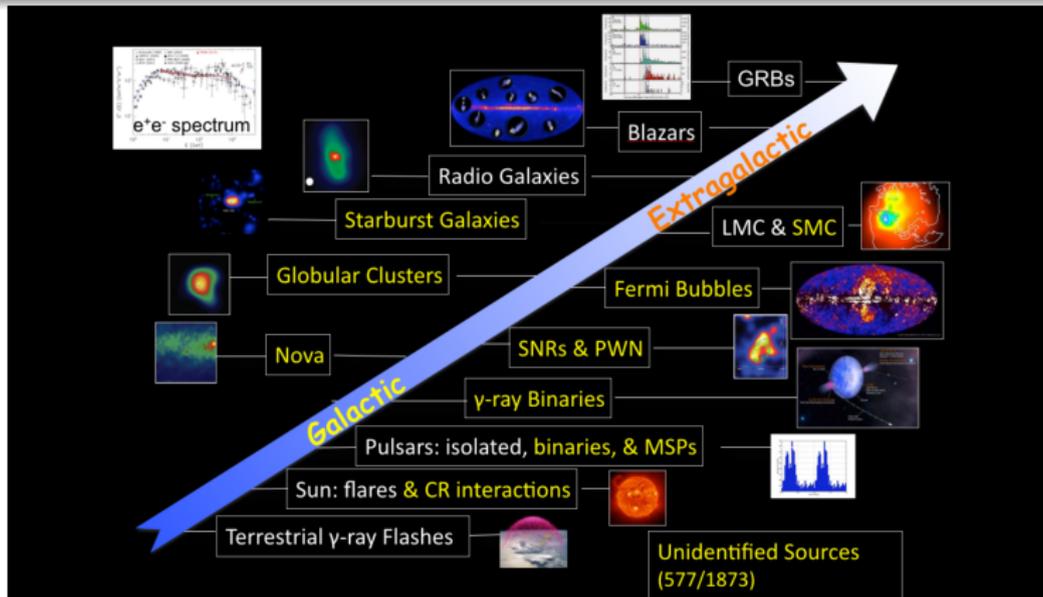
Seth Digel

INFN-Pisa

[melissa.pesce.rollins@pi.infn.it](mailto:melissa.pesce.rollins@pi.infn.it)

News MB+SB September  
Meeting

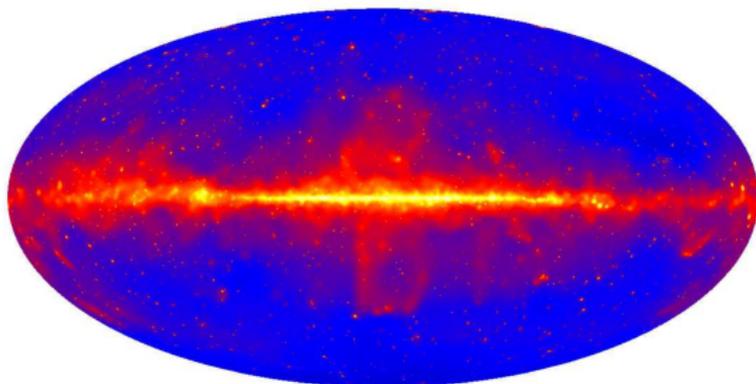
# Fermi-LAT SCIENCE MENU



WP4: Focus on four topics

- ▶ *Fermi*-LAT source catalog (4FGL)
- ▶ WIMP dark matter searches
- ▶ Cosmic-Ray Electron science
- ▶ Electromagnetic counterparts to gravitational wave events

# Fermi SOURCE CATALOGS



- ▶ 3<sup>rd</sup> Fermi high energy list (3FHL)
- ▶ 10 GeV - 2 TeV
- ▶ Available on arxiv - proof received on August



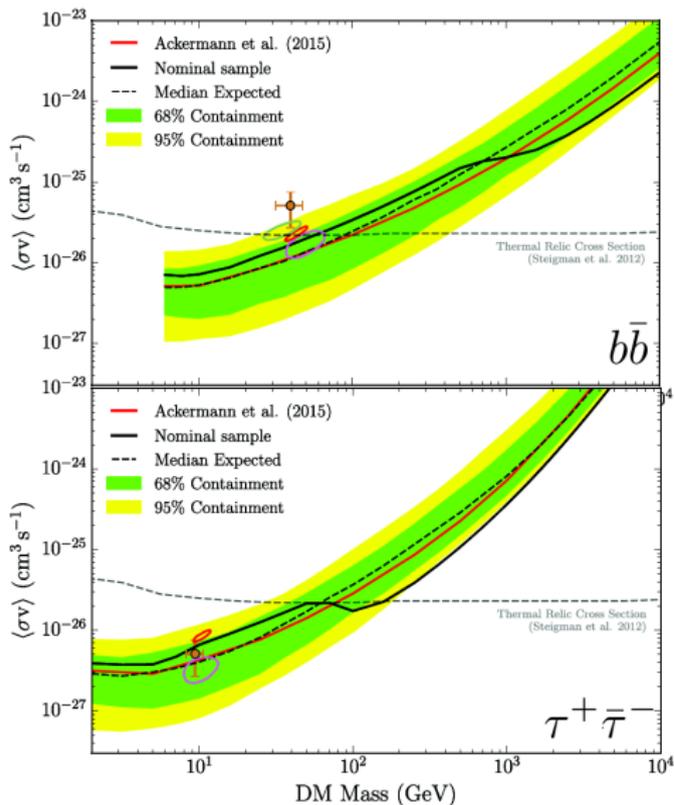
The first 7 years of data using the Pass 8 event-level analysis (3FHL)

- ▶ 1556 sources, ~80% are extragalactic sources, 214 new gamma-ray sources

Next catalog in the pipeline: 4FGL and 4LAC (8 years of data using Pass 8 event-level analysis and 0.1 GeV- 2 TeV)

- ▶ Working in parallel on detections, associations and identifications of gamma-ray sources

# DARK MATTER SEARCHES



- ▶ WP4 team has contributed to the analysis of WIMP dark matter searches with dwarf satellites
- ▶ Analysis based on 45 confirmed and candidate dwarf spheroidal galaxies
  - ▶ Increased from a sample of 15
  - ▶ The limits derived are up to a factor of 2 more constraining at large DM masses than before
  - ▶ LAT & DES Collaborations, ApJ 834, 110 (2017)

# FOLLOW-UP TO GRAVITATIONAL WAVE EVENTS



- ▶ WP4 team has improved the automatic pipeline that performs the dedicated analyses to search for electromagnetic counterparts to gravitational wave events in Fermi-LAT data
- ▶ The pipeline now automatically generates webpages with the results of the analysis (plots, tables and figures) to facilitate distribution of information
  - ▶ Imperative not only for LAT internal use but also for the prompt communication to the multi-wavelength community