Analyzing the Fermi Bubbles with Dark Matter Particle Explorer

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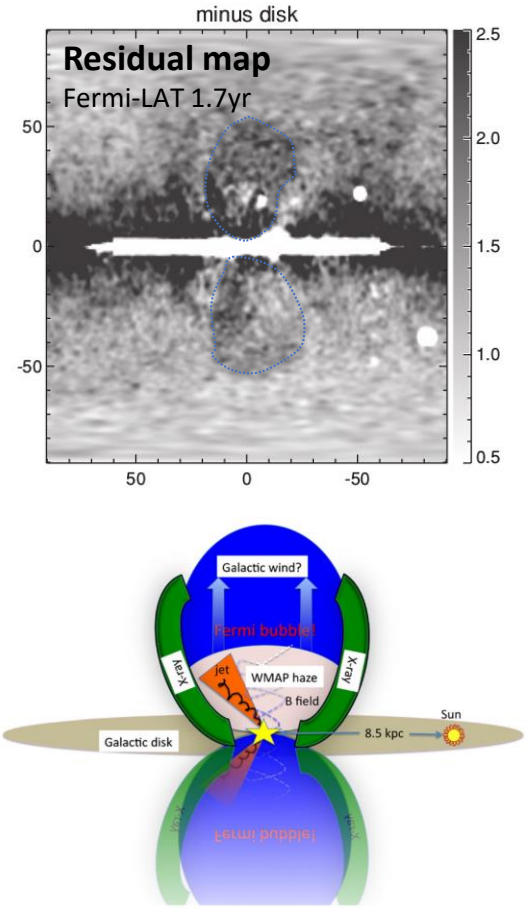
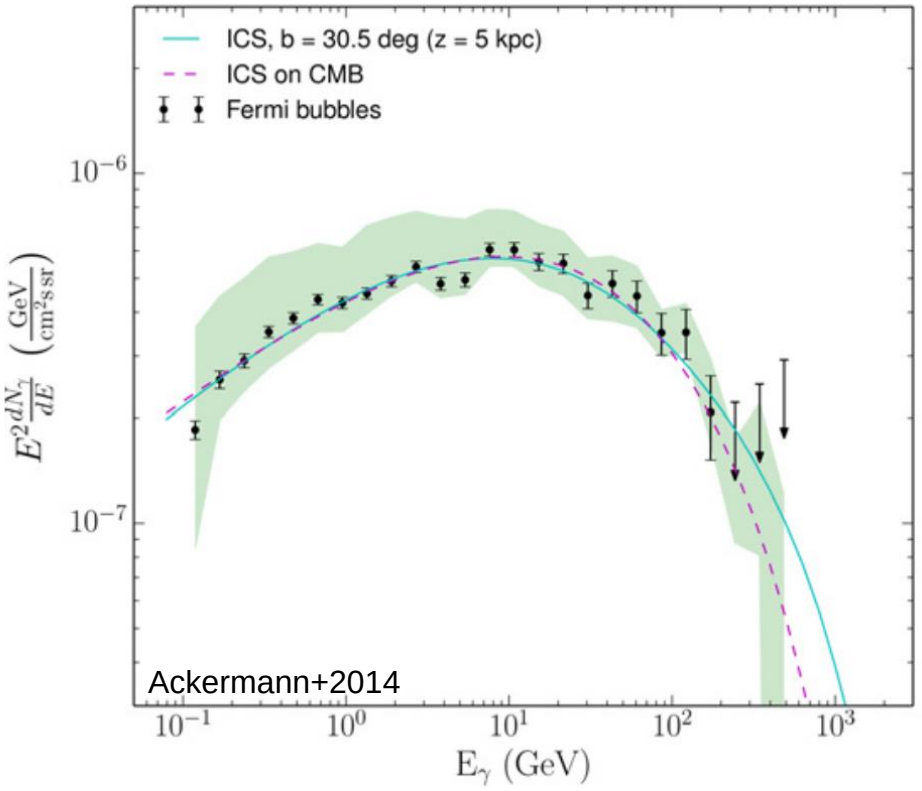
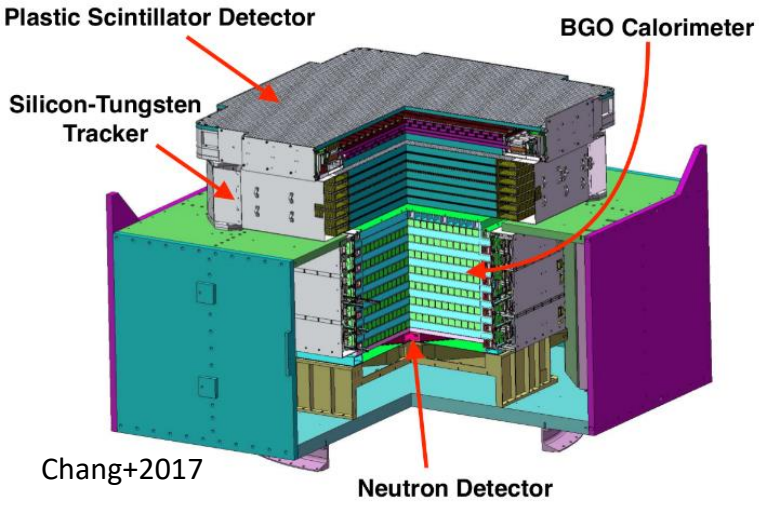
1. Fermi bubbles



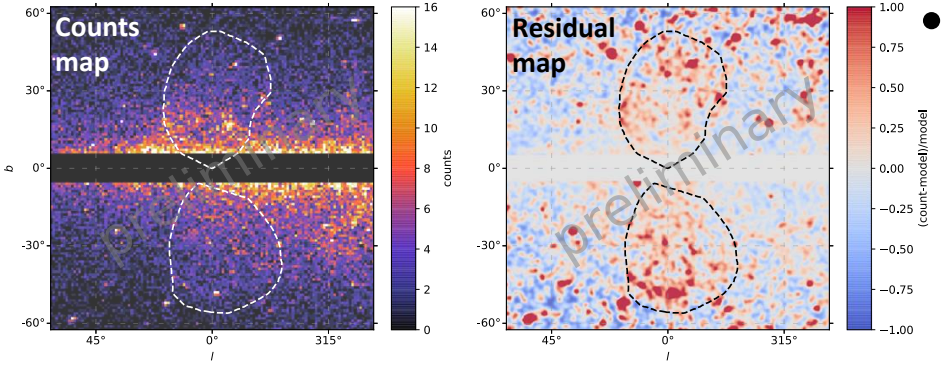
Su+2010



2. Data analyses

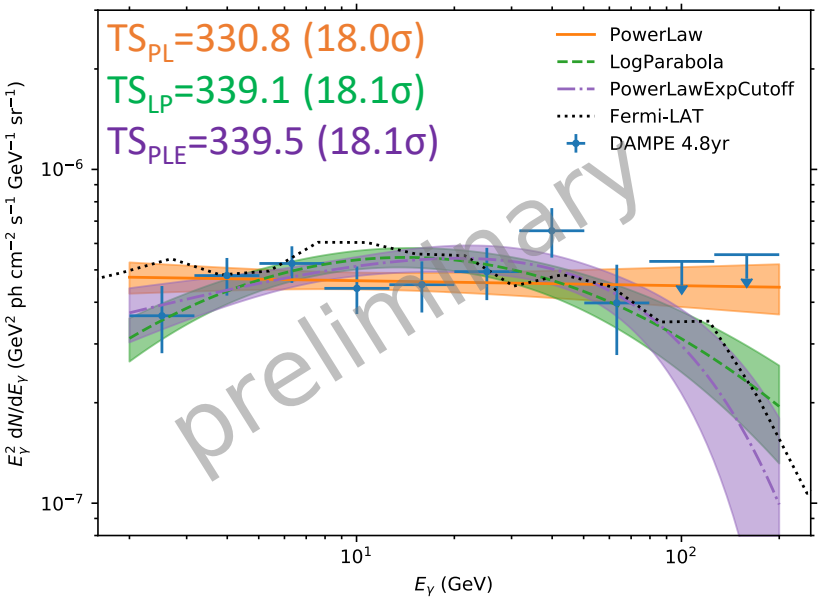


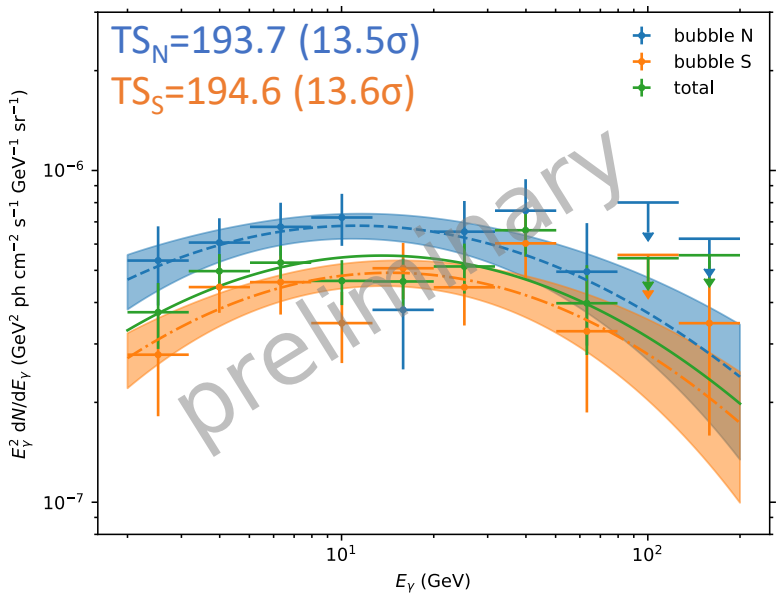
Chang+2017



- DATA:
  - ✓ 4.8yr DAMPE photon data
  - ✓ 2-200 GeV
  - ✓ $|l| < 60^\circ$ and $5^\circ < |b| < 60^\circ$
  - ✓ 1° HEALPix spatial bins, 20 logarithmically spaced energy bins
  - ✓ Remove 2° photon data near the point source candidates (Duan+2021)
- MODEL:
  - ✓ Galactic diffuse emission model from Fermi-LAT (gll_iem_v02)
  - ✓ Fermi Bubbles (Su+2010)
  - ✓ Loop I (Wolleben2007)
  - ✓ Isotropic emission

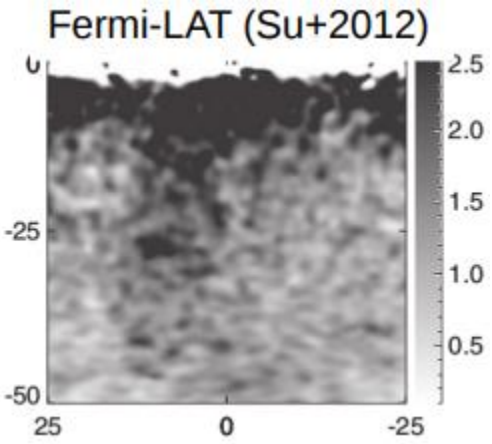
Spectrum of the Fermi bubbles

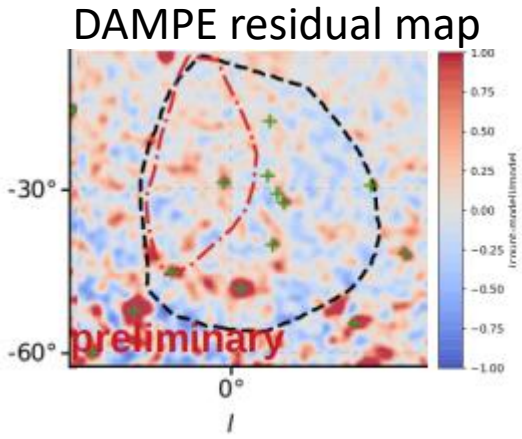


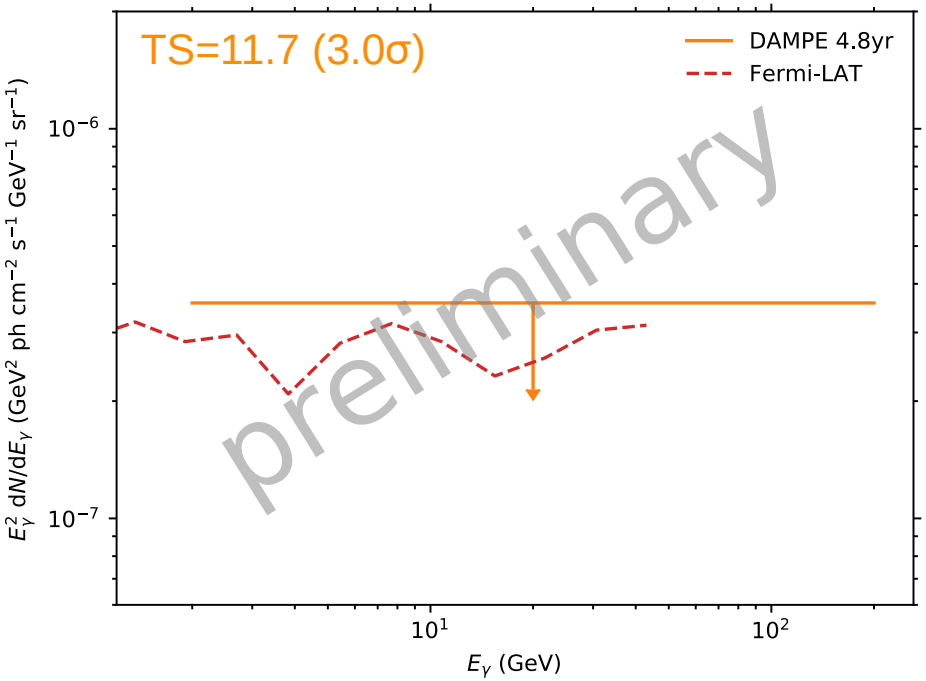


- The Fermi bubbles are significantly detected in DAMPE data (>18σ)
- The best-fit spectral index of PowerLaw model is -2.01 ± 0.05
- The spectrum is found to be slightly curved (2.9σ). The index and cutoff energy are -1.7 ± 0.2 and 78 ± 40 GeV for the PowerLawExpCutoff spectrum
- The two lobes have the similar spectral shape. The north one appears to be stronger, which is probably caused by the uncertainty of Galactic diffuse emission

Search for the cocoon

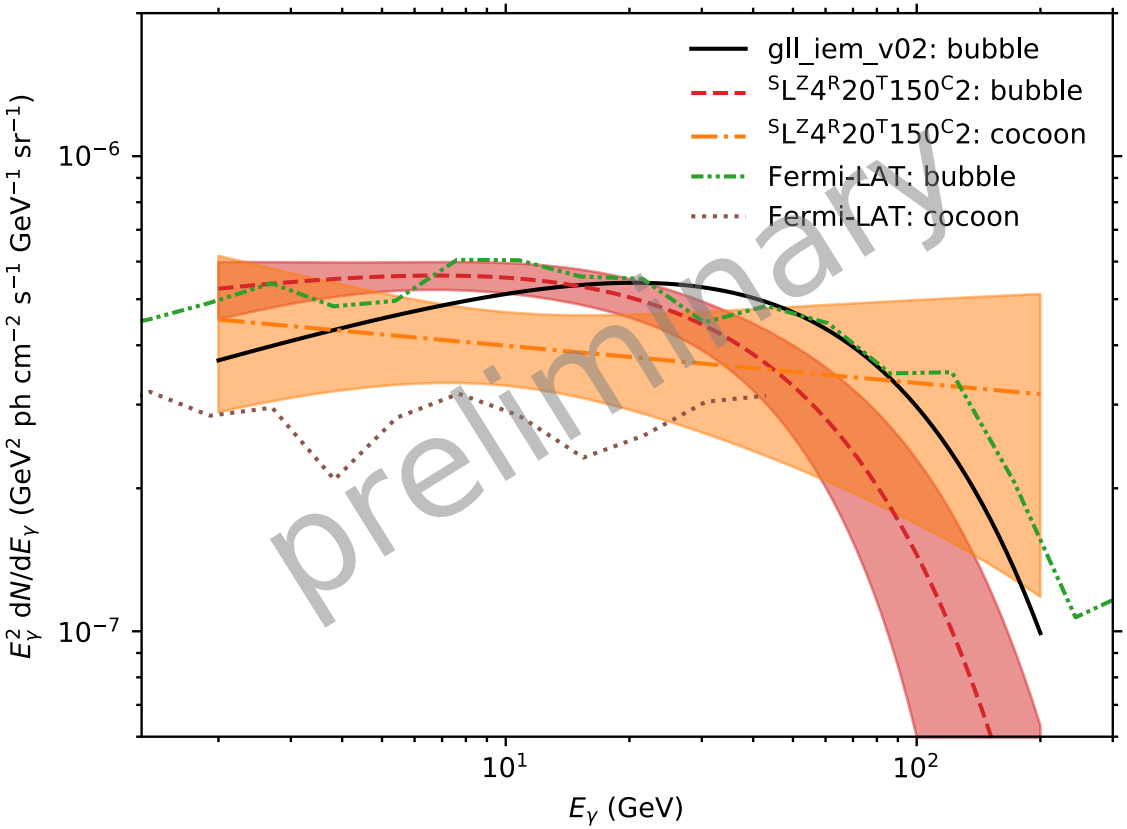






- The cocoon is not significantly detected in the 4.8-yr DAMPE data
- The 95% confidence level upper limit is consistent with the previous results

3. Systematic uncertainty



- The Galactic diffuse emission (GDE) model is changed to the template calculated with the Galprop parameter set $^{S}L^{Z}4^{R}20^{T}150^{C}2$
- The GDE model affect the spectra and significances. The TS values (significances) of Fermi bubbles and cocoon are 281.4 (16.3σ) and 33.5 (5.4σ), respectively

Thanks for your attentions!