

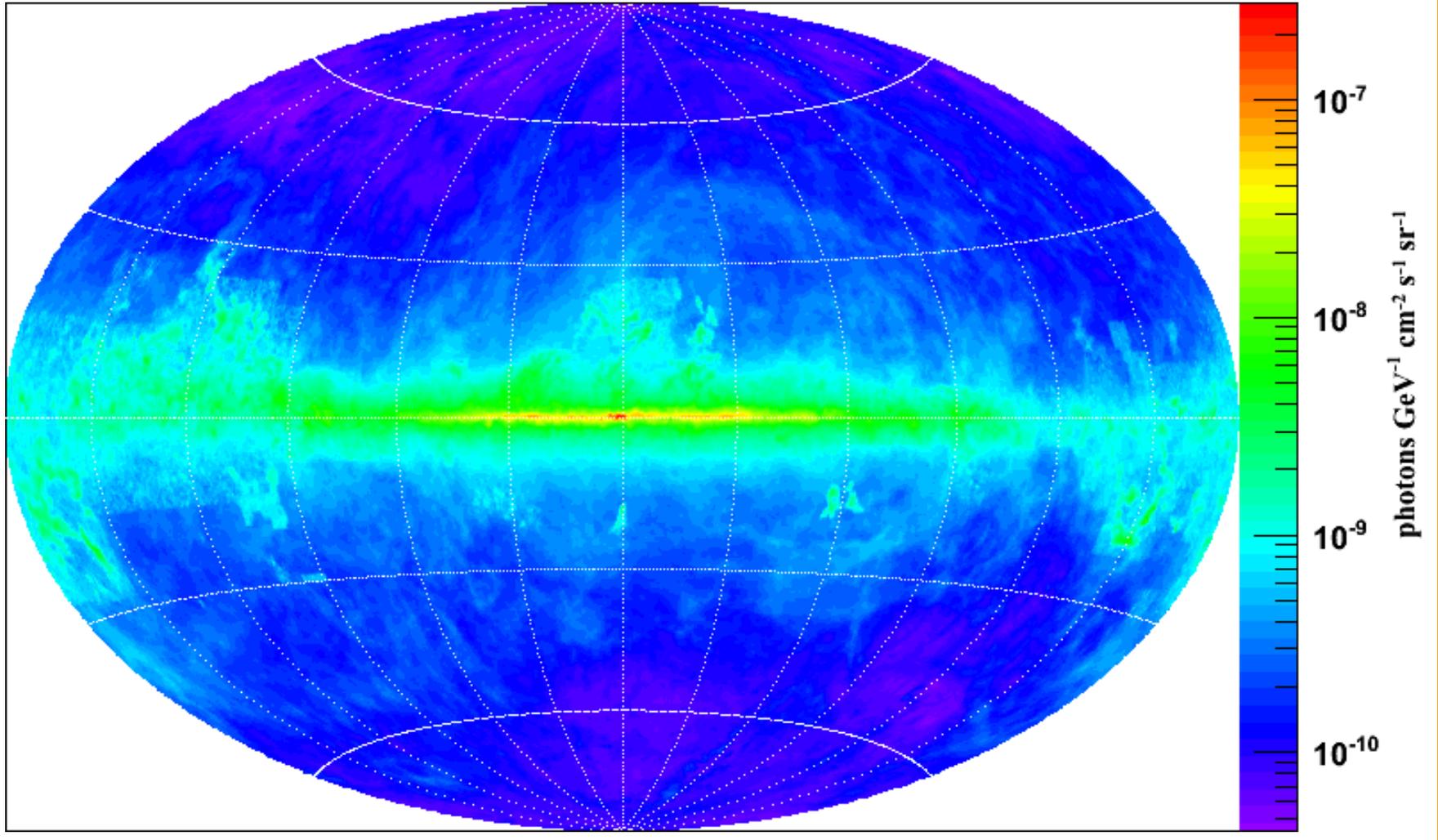
Gamma ray angular power spectrum

Timur Delahaye

Fornasa et al. 2012 arXiv:[1207.0502](https://arxiv.org/abs/1207.0502)

Fornasa et al. 2012 in prep

Galactic γ rays



TD, Fiasson, Pohl & Salati

A&A2011

γ rays

- π_0 decay \Rightarrow p and gas
- Bremsstrahlung \Rightarrow e and gas
- Inverse Compton \Rightarrow e and ISRF

γ rays : π^0 component

- p and α spectra
- Interstellar gas distribution and composition
- Production cross-sections

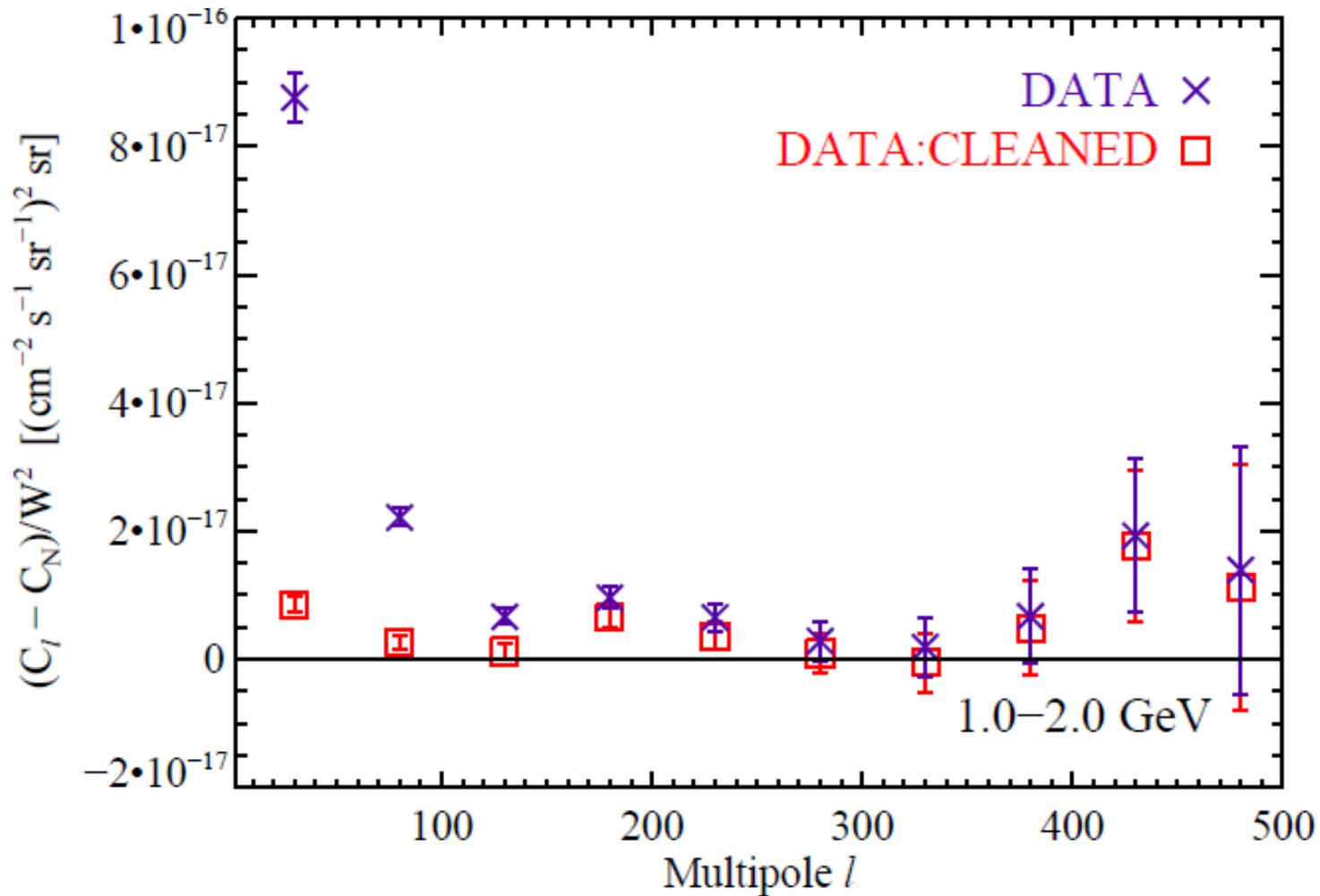
Angular Power Spectrum

In collaboration with:

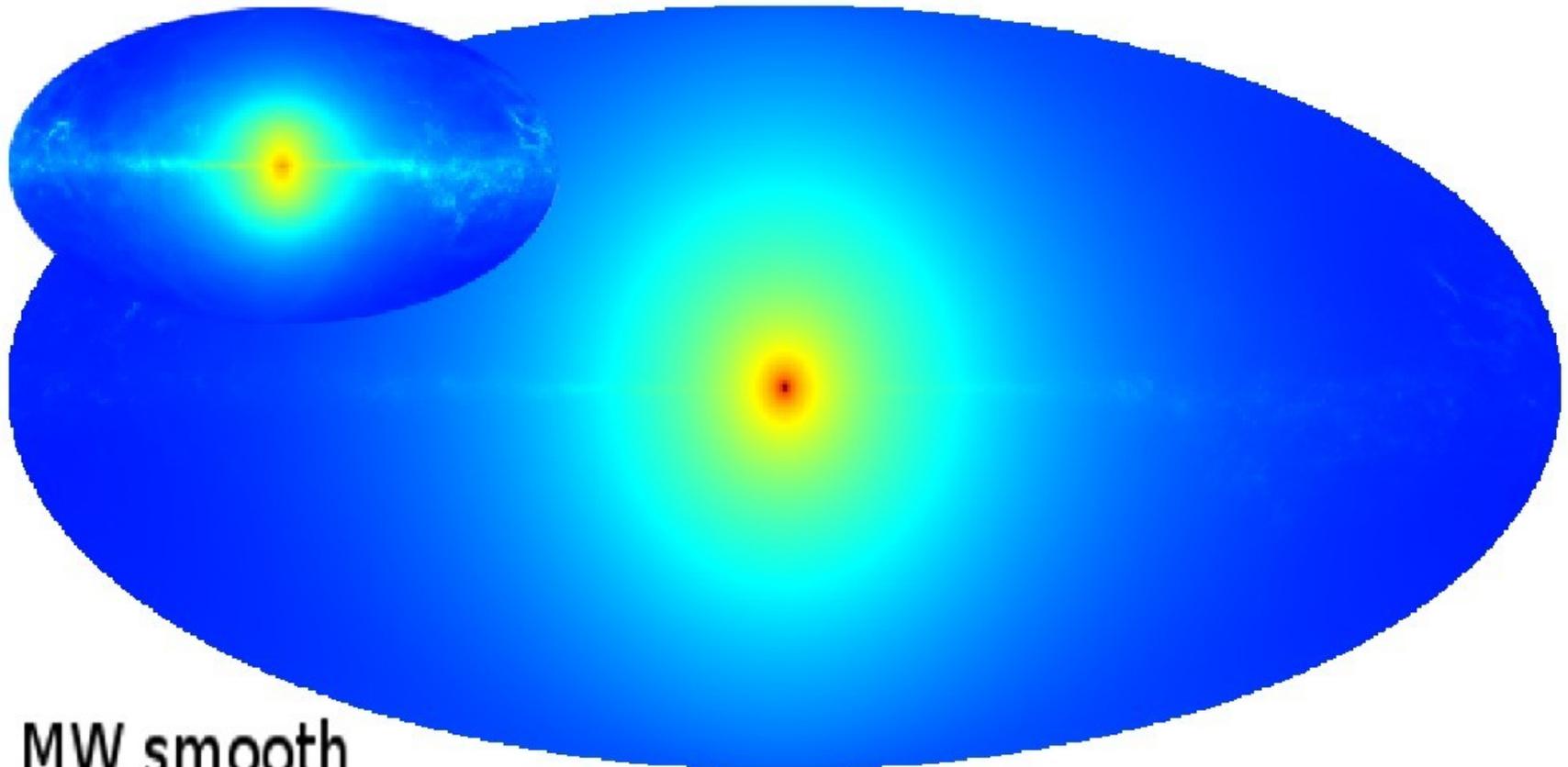
Mattia Fornasa, Jesús Zavala,
Miguel Angel Sánchez-Conde,
Jennifer Siegal-Gaskins, Francisco Prada, Mark
Vogelsberger, Fabio Zandanel, &
Carlos Frenk

+ German Gomez, Aldo Morselli, Vincenzo
Vitale, Tim Linden, Eiichiro Komatsu,
Alessandro Cuoco, & Luca Latronico

Data



γ ray morphology

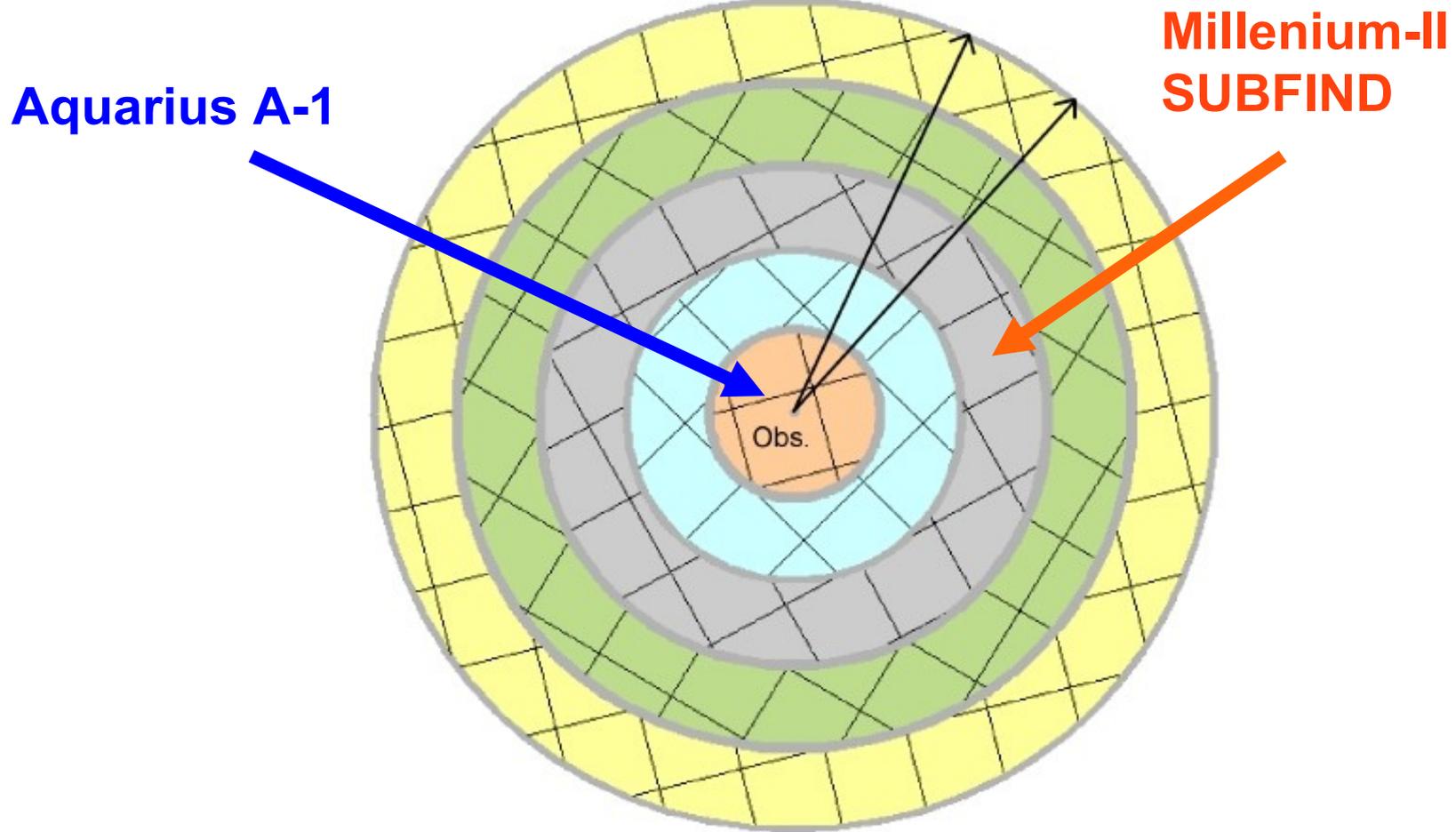


MW smooth

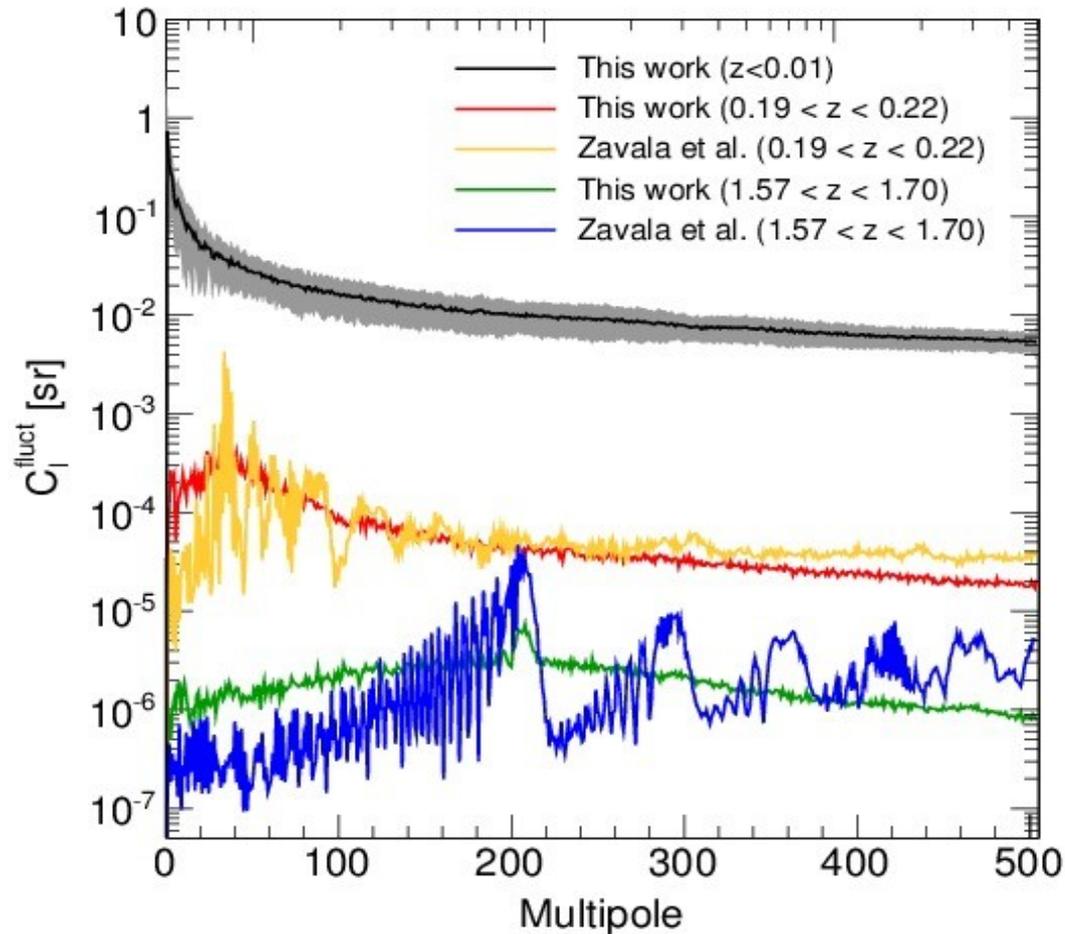
-2.0

3.0

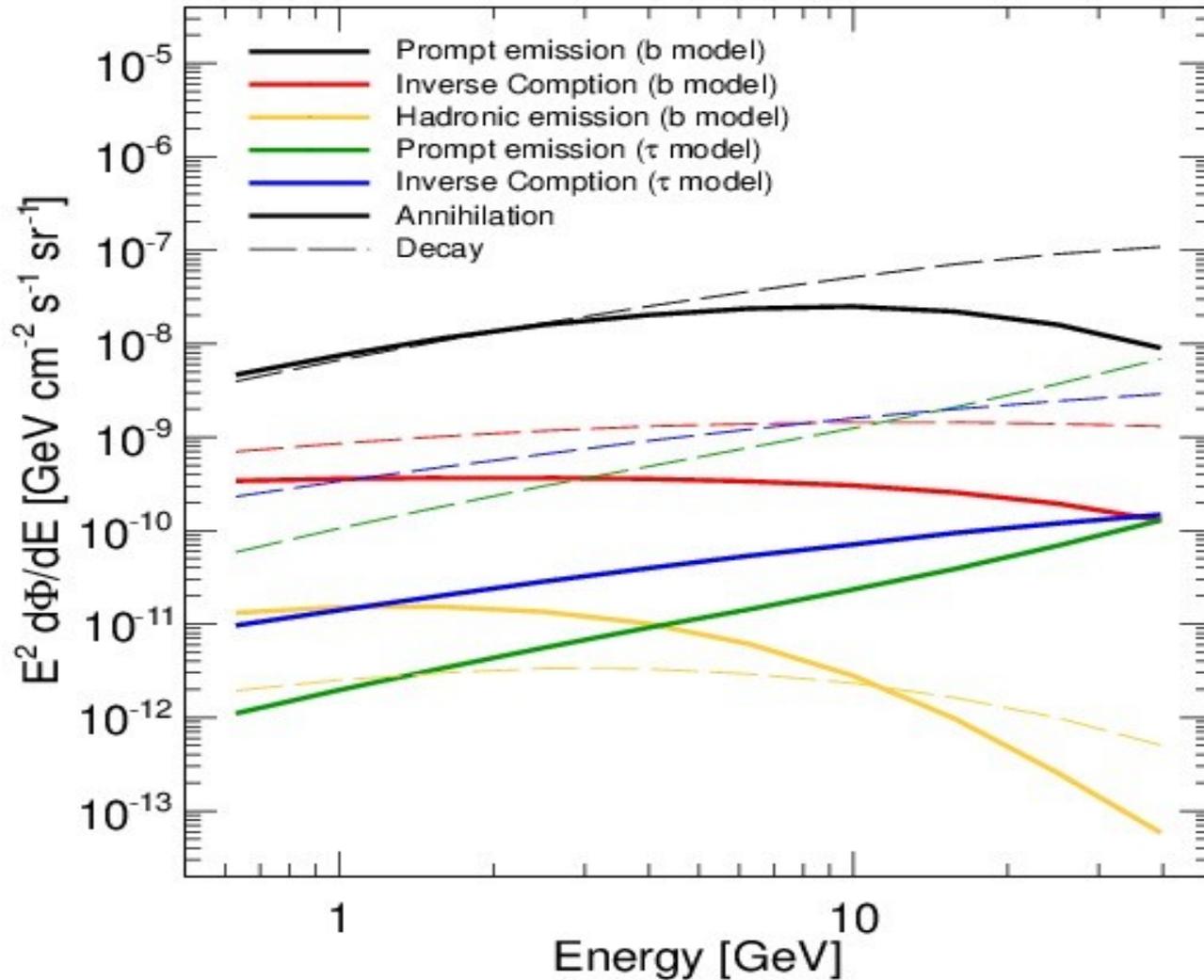
Simulating the Universe



Angular power spectrum: testing the method



The spectra



Components

Extra Galactic:

- Resolved haloes

- Unresolved main haloes

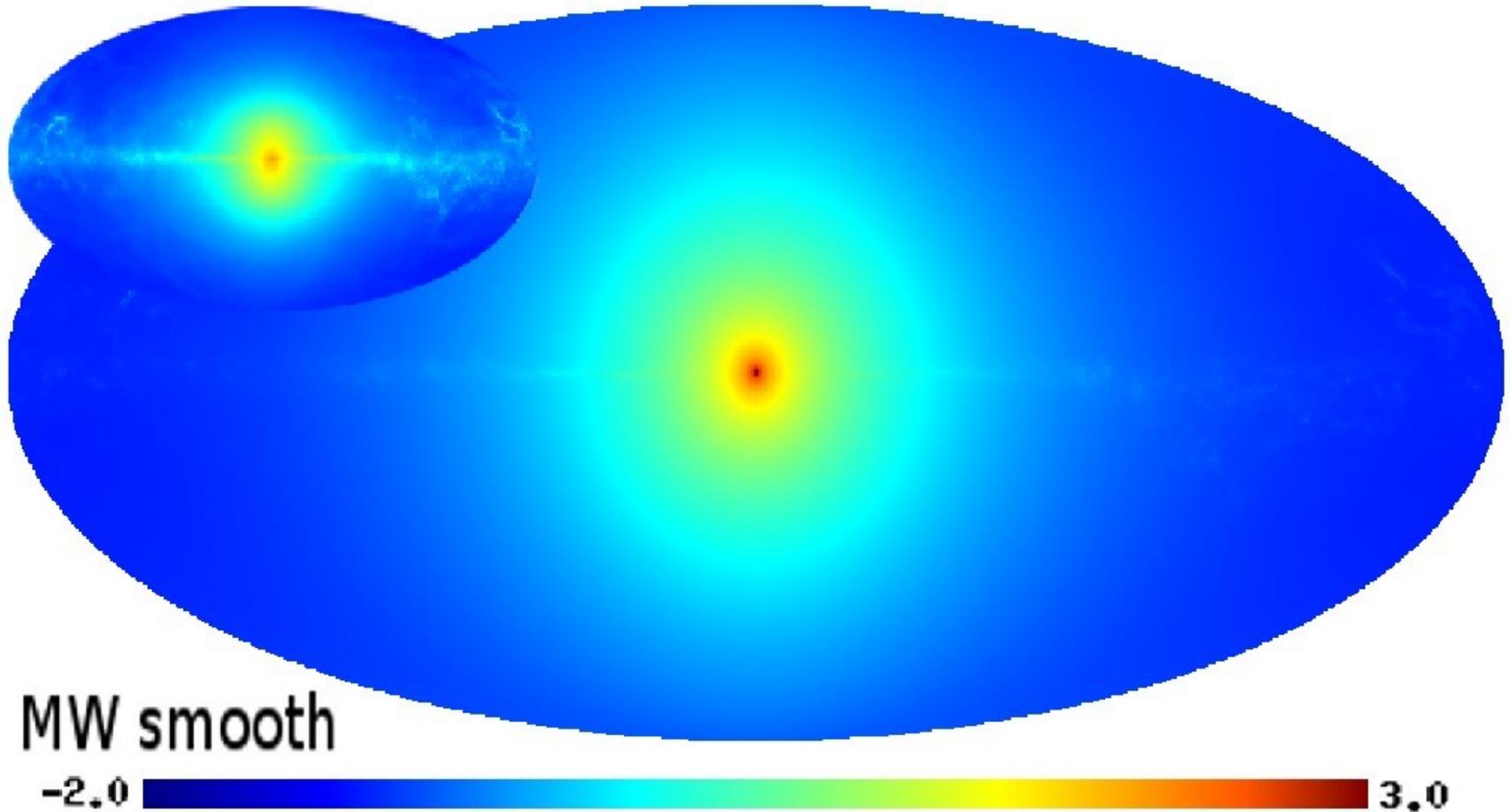
- Unresolved subhaloes

Galactic:

- Smooth halo

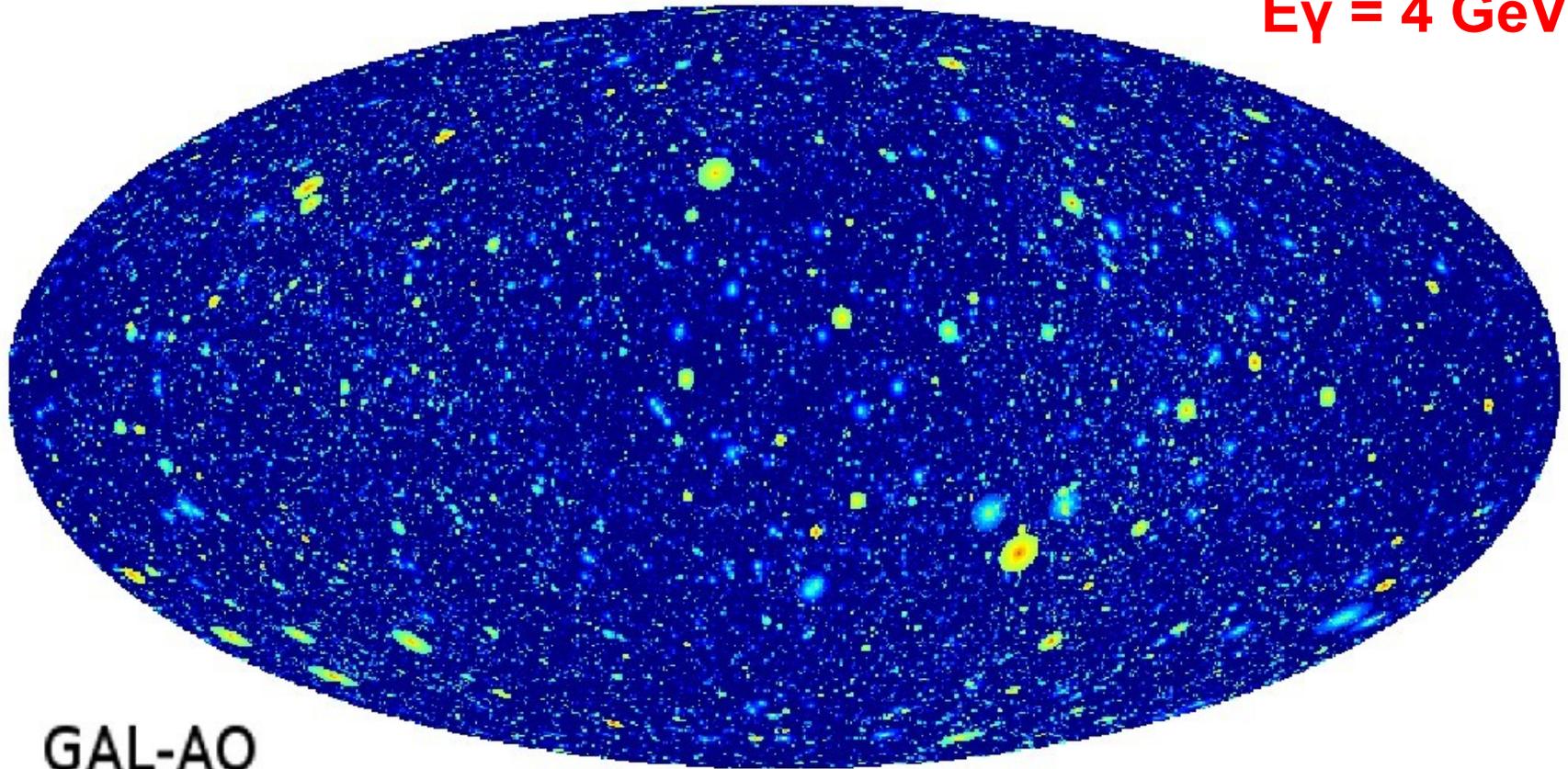
- Subhaloes

γ ray morphology



The sky

$E_\gamma = 4 \text{ GeV}$



GAL-AQ

-1.0

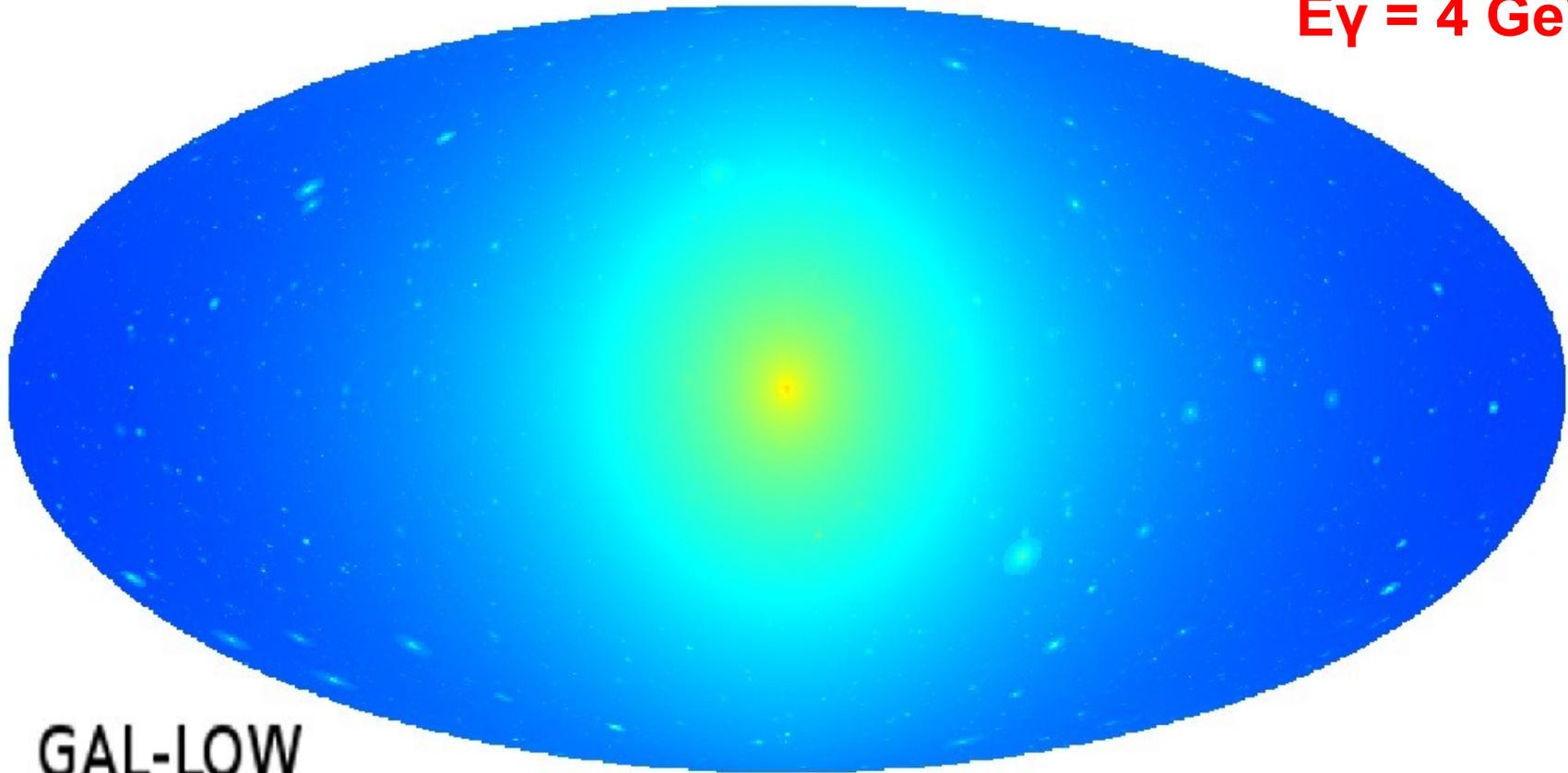


3.0

Decay $m_\chi = 2 \text{ TeV}$ $\tau = 2 \times 10^{27} \text{ s}$

The sky

$E_\gamma = 4 \text{ GeV}$



GAL-LOW

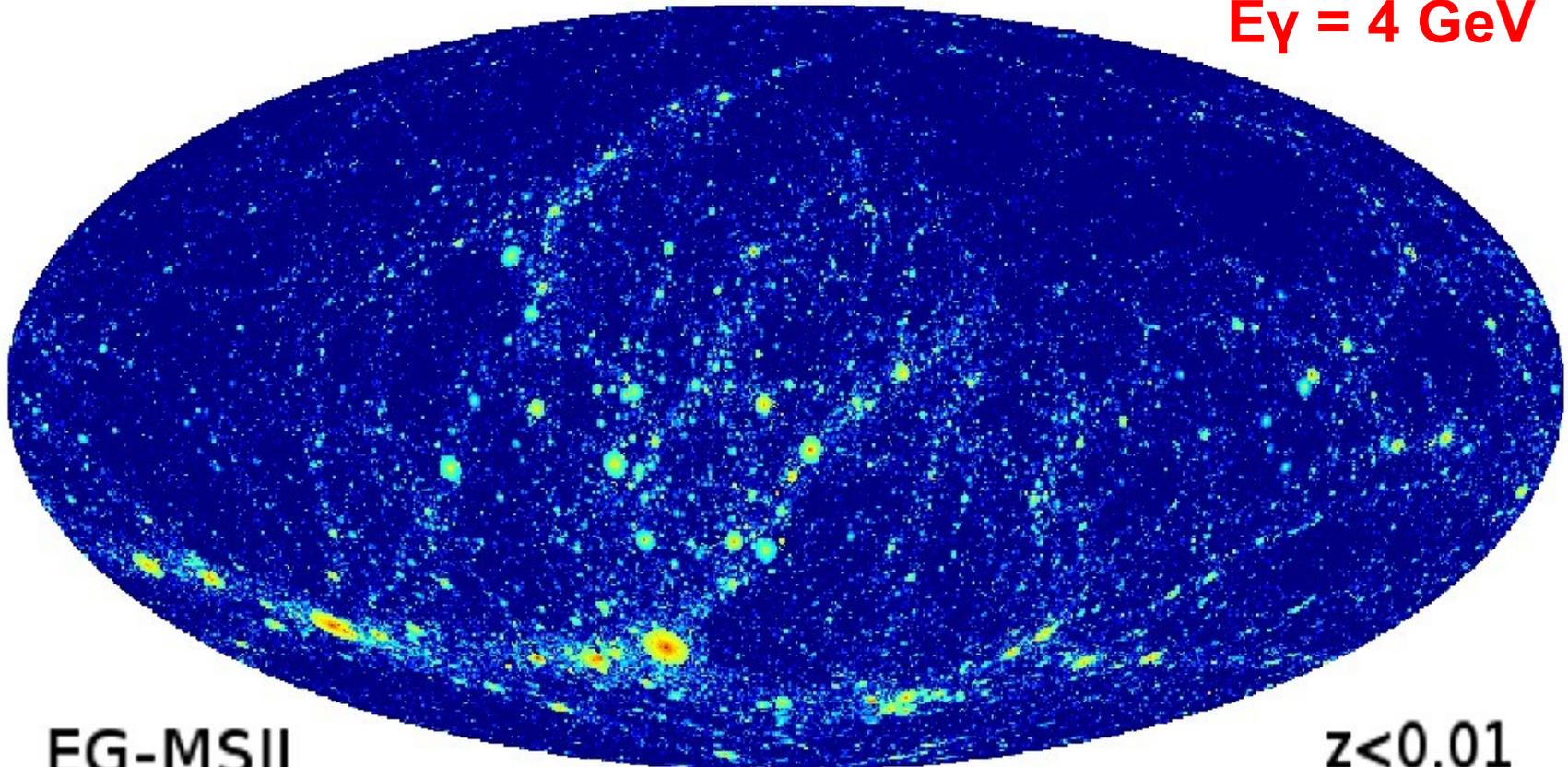
-1.0

2.0

Decay $m_\chi = 2 \text{ TeV}$ $\tau = 2 \times 10^{27} \text{ s}$

The sky

$E_\gamma = 4 \text{ GeV}$



EG-MSII

$z < 0.01$

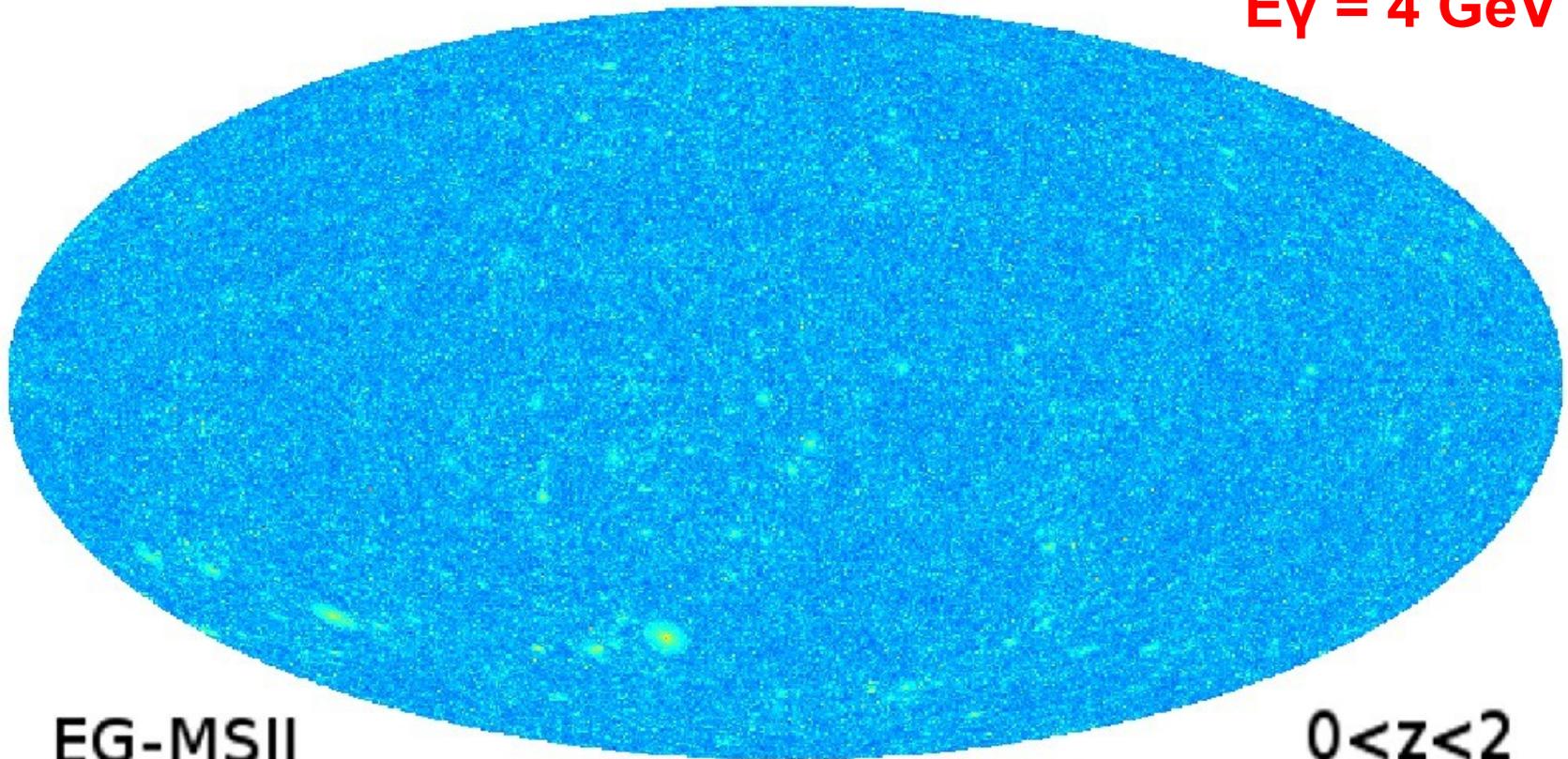
-1.0

3.0

Decay $m_\chi = 2 \text{ TeV}$ $\tau = 2 \times 10^{27} \text{ s}$

The sky

$E_\gamma = 4 \text{ GeV}$



EG-MSII

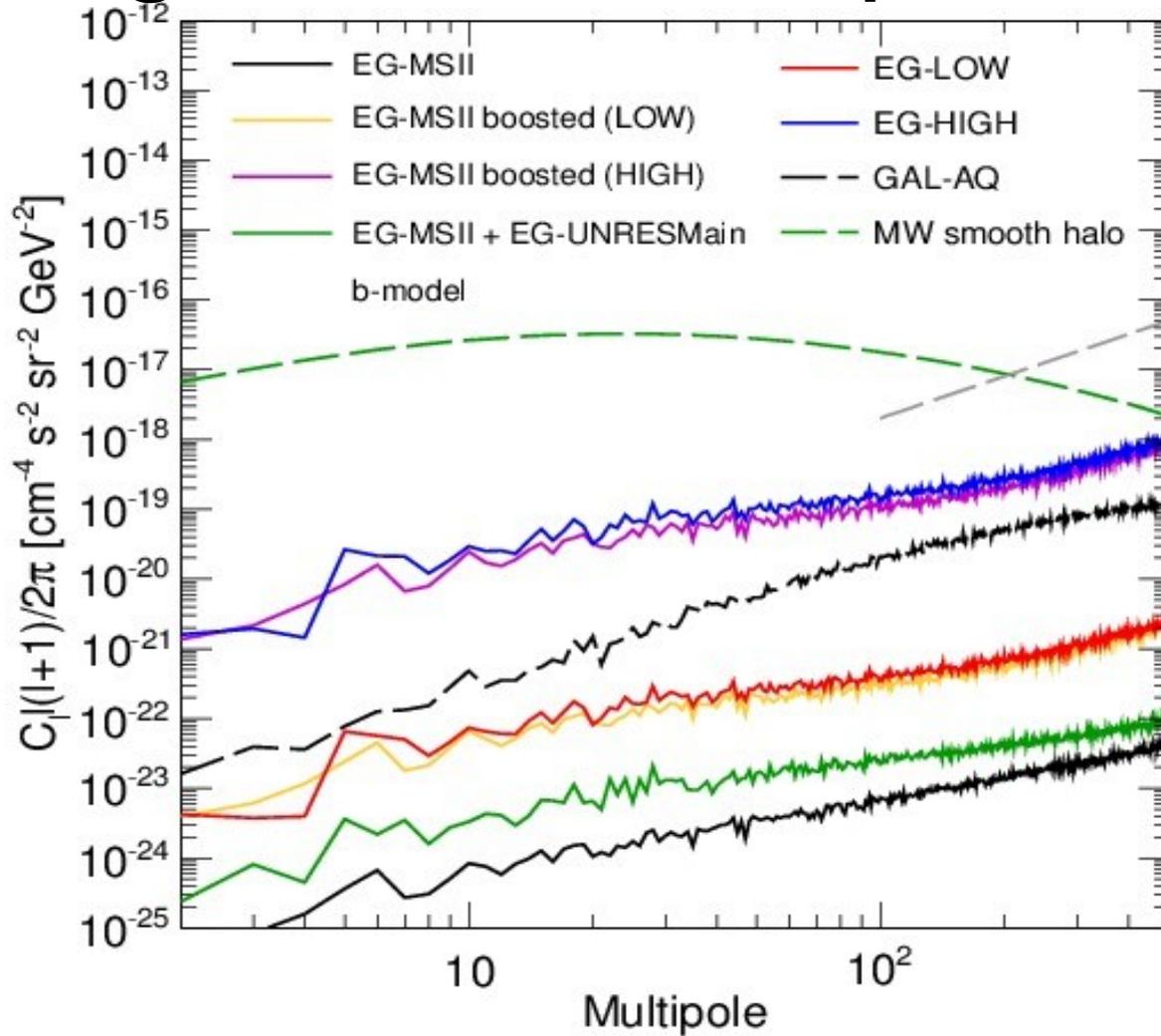
$0 < z < 2$

-1.0

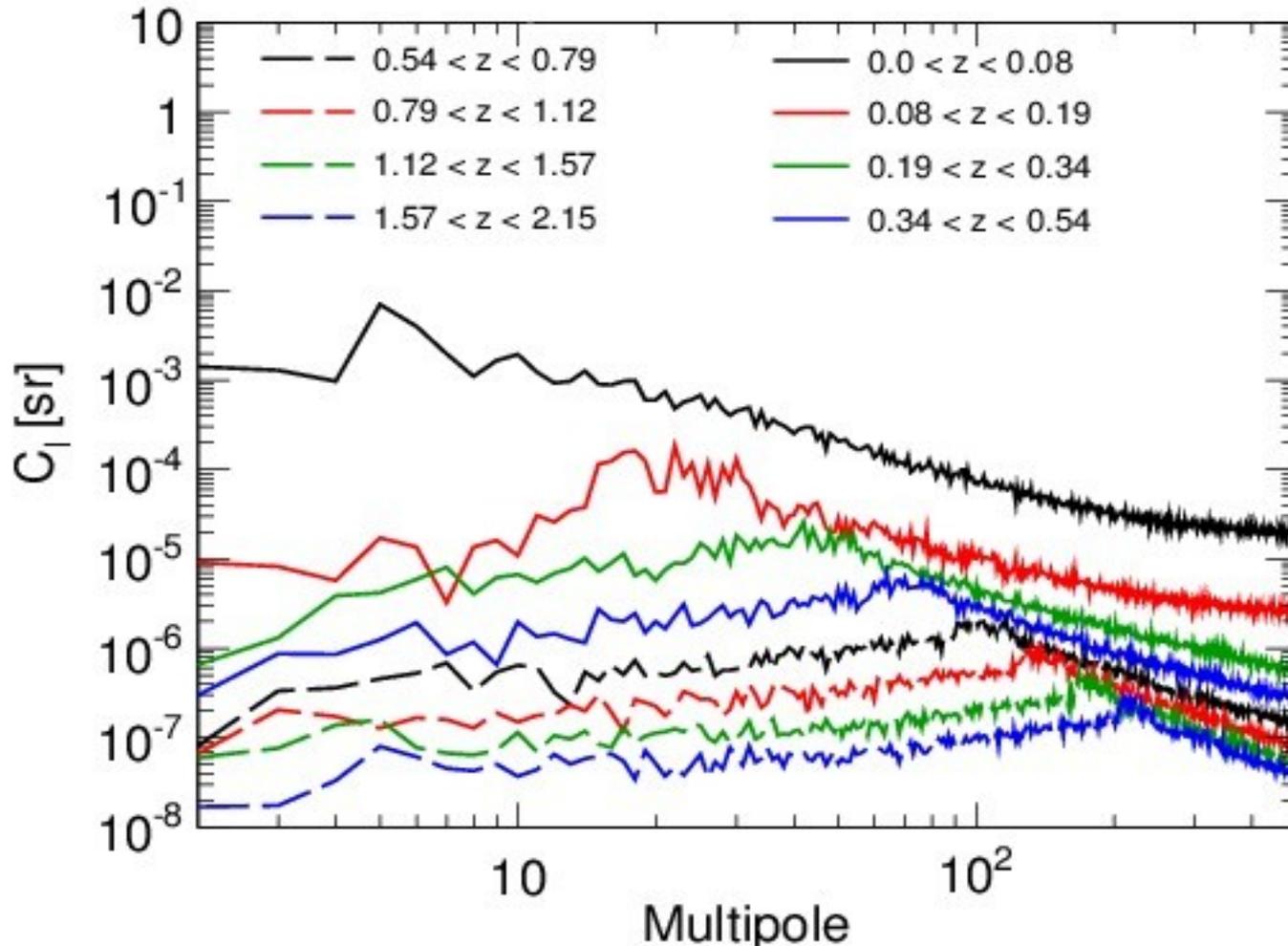
2.0

Decay $m_\chi = 2 \text{ TeV}$ $\tau = 2 \times 10^{27} \text{ s}$

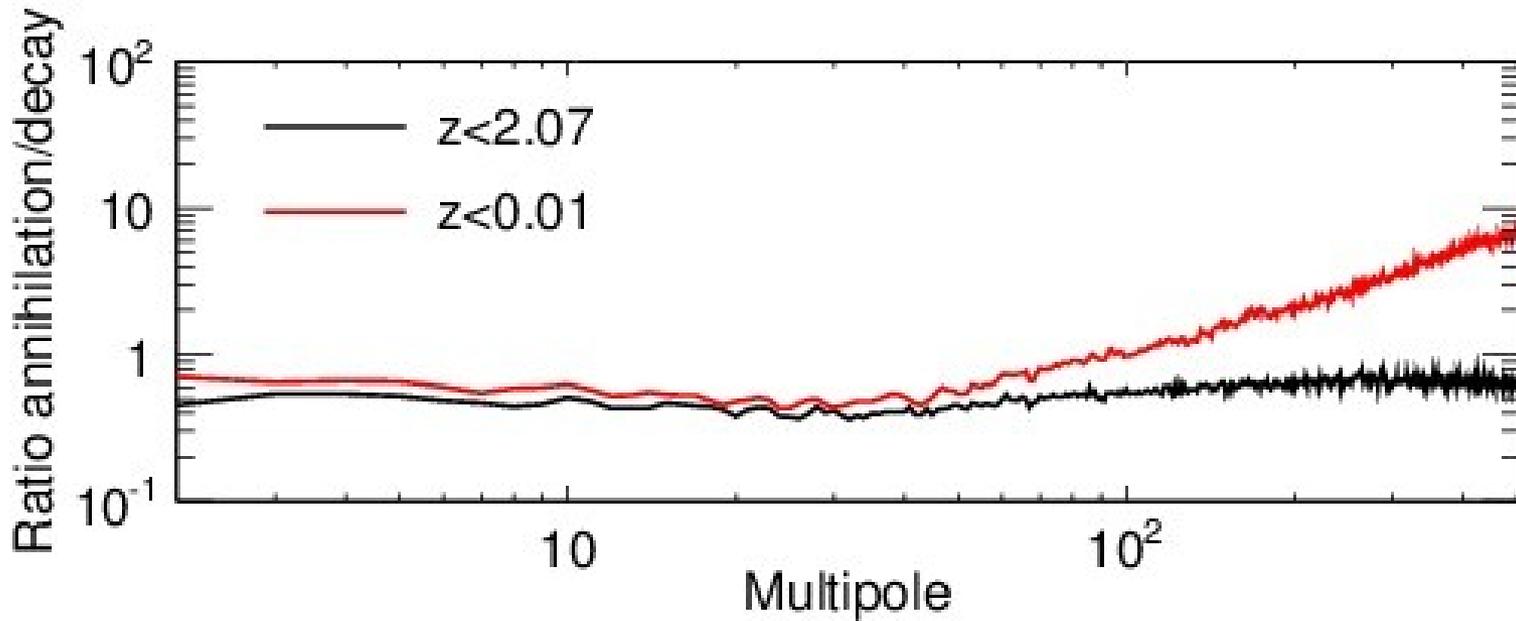
Angular Power Spectrum



Angular Power Spectrum

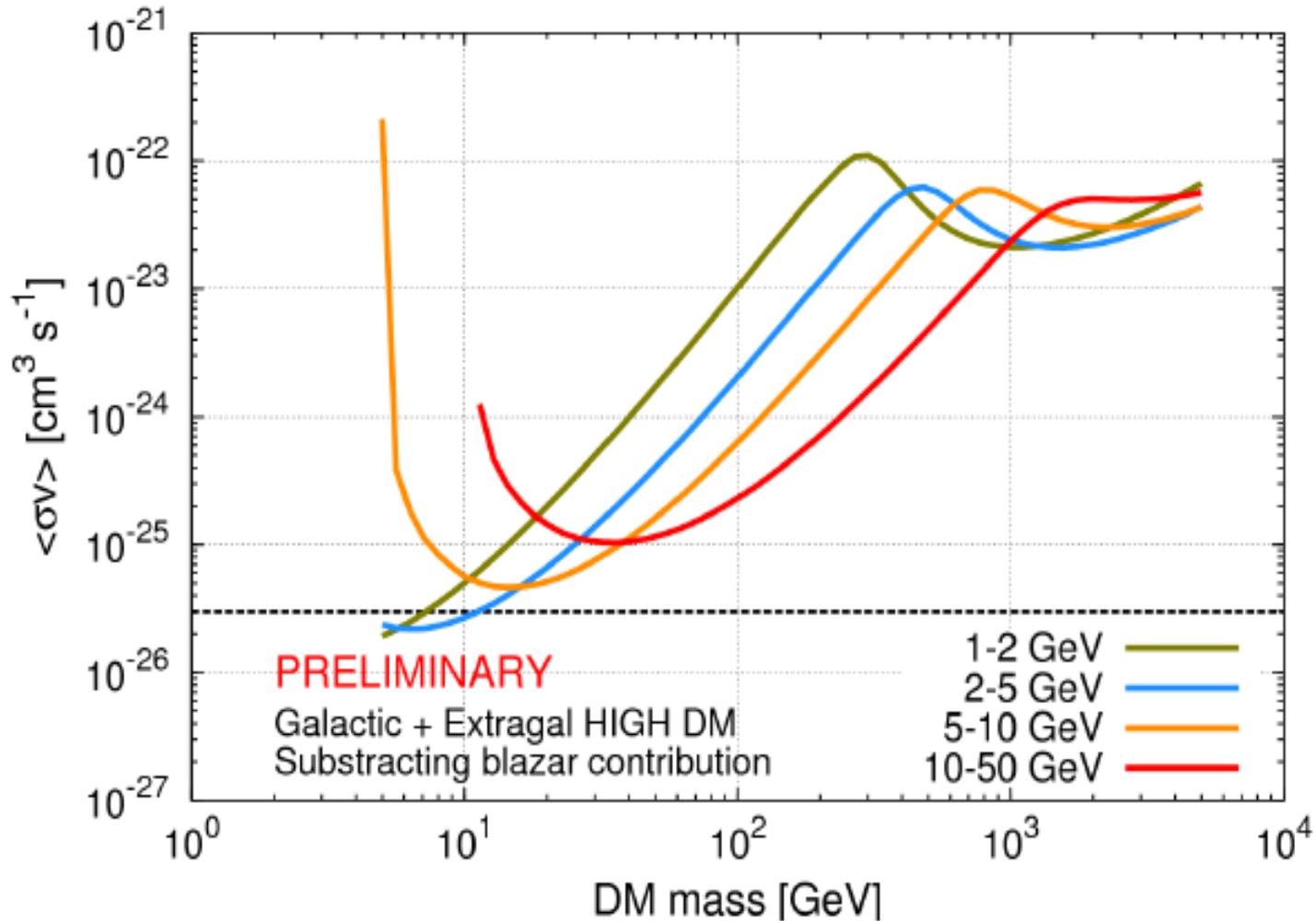


Annihilation versus decay



Setting constraints

$$\chi\chi \rightarrow \tau^+\tau^-$$



Conclusions

Angular power spectrum is a promising detection method



Data are constraining already

New data are coming soon !

