



*Objectives of the 3<sup>rd</sup> PCHE Workshop on  
Diffuse emissions:  
The infrared-radio-gamma connection*

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# *Towards a self-consistent high energy picture of the Milky Way*

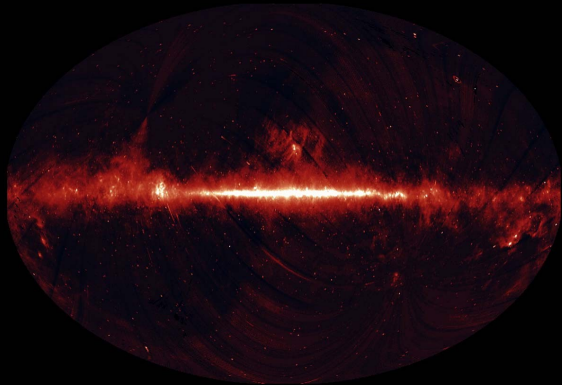
**Previous workshops dedicated to the Galactic diffuse gamma-ray emission:**  
experiment+theory, gathering cosmic ray physics (sources in multi- $\lambda$ ,  
propagation), interstellar medium  $\Rightarrow$  **Extend to diffuse in multi- $\lambda$  and EG**

- **Cosmic ray protons:** propagation over the Galactic scale, **0<sup>th</sup> order modeling rather satisfying**, with local constraints on the parameters
- **Issues:** ISM and sources in the Galactic center + role of high energy electrons + connect turbulence theory to CR propagation
- **Herschel:** ISM+ISRF (dust, SF regions) + extra-galactic IR background (absorption of EG gamma-rays)
- **Planck:** understanding of B-field + high energy electrons (foregrounds)

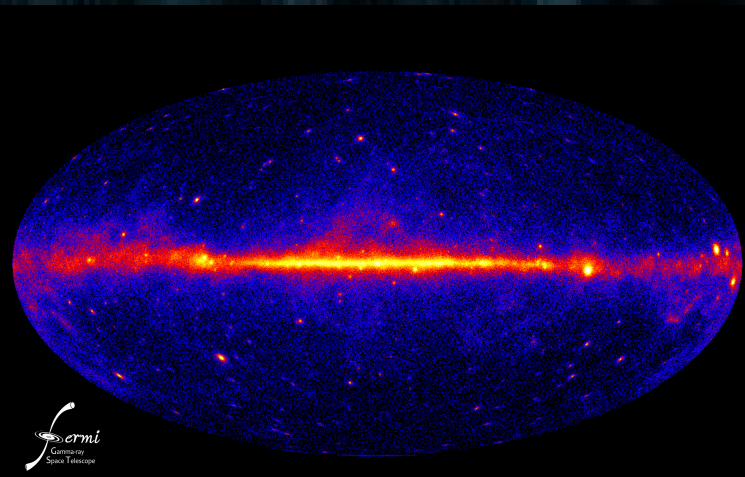
 **Derive a self-consistent modeling of the high energy processes in the MW**

# IR-gamma-radio Milky Way picture

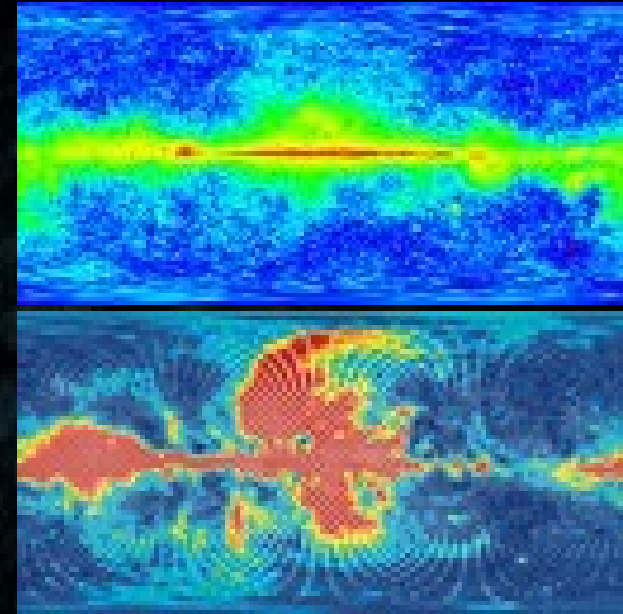
FIR AKARI 90-140  $\mu\text{m}$



Fermi 0.1 MeV – 200 GeV



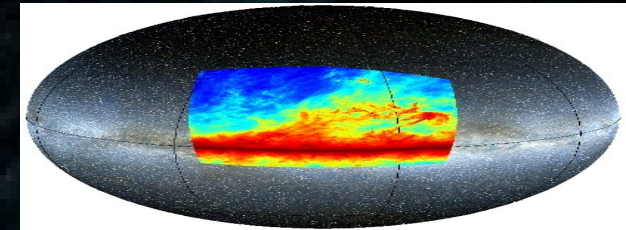
WMAP-5 23 GHz (unpol/pol)



Herschel 60-670  $\mu\text{m}$

- EG-IR background
- ISM phases (connection with ISM turbulences ?)
- Star forming region (environment of CR sources)


- HE sources G+EG
- CR + ISM modeling (diffuse Galactic emission)
- EG diffuse emission



Planck 30-850 GHz (1<sup>st</sup> piece of sky)

- Cosmology from CMB
- +++ B-field + CR electrons

# Summary

- Gather experts in an **interdisciplinary** framework : **experiment+theory**
  - Share knowledge, **involve students** (“questions des étudiants” session)
  - National scale + few foreign experts : develop a **working network** through PCHE
  - Favor **collaborations** + develop **tools** + answer fundamental questions in high energy astrophysics (cosmic ray sources, propagation, interaction with ISM), towards an high energy modeling of galaxies (to be included in simulations ?).
-  Define new generic properties of galaxies ?

## Menu :

- Experimental reviews (Fermi, Planck, Herschel)
- Diffuse gamma-ray and radio emissions
- IR sky
- Magnetic field(s)
- Interstellar medium
- Cosmic ray sources and transport

**Enjoy !**