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- ⇒ Study of a **toy-model** for the **diffuse gamma ray flux** coming from the galactic center:

$$\phi_{diffuse} = N_b \phi_b + N_\chi \phi_\chi$$

Features of the toy model:

- ⇒ It contains essentially 2 parameters:
the normalization ratio N_χ/N_b and the neutralino mass M_χ
- ⇒ The dependence from supersymmetric parameters is “hidden” in M_χ

The diffuse gamma ray background is modelised following Strong and Moskalenko with an unknown normalization factor N_b .

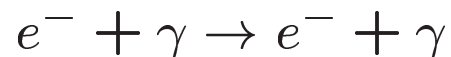
Two main processes have been considered:

⇒ π^0 production



where $X = H$ or He

⇒ ICS (Inverse Compton Scattering)



For the contribution coming from the neutralino annihilation we have considered 5 different channels.

The processes are, at tree level:

$$\Rightarrow \chi\chi \rightarrow t\bar{t}$$

$$\Rightarrow \chi\chi \rightarrow b\bar{b}$$

$$\Rightarrow \chi\chi \rightarrow c\bar{c}$$

$$\Rightarrow \chi\chi \rightarrow W^+W^-$$

$$\Rightarrow \chi\chi \rightarrow Z^0Z^0$$

The hadronization for this final states, in order to produce $\pi^0 \rightarrow \gamma\gamma$, is simulated by a Monte Carlo method (*Phytia*)

Detectability (GLAST) of a toy model:

χ^2 method (or likelihood ratio)

The model depends only by 2 parameters:

$$\chi^2 = \chi^2(N_\chi/N_b, M_\chi)$$

The normalizations ratio N_χ/N_b is constrained by the **Egret data** (for the galactic center *Mayer-Hasselwander A&A335, 1998*).

Only 3 experimental points \Leftarrow **not at all satisfactory!!**

$$\left(\phi_{diff}\right)_{SM} \leq N_b\phi_b + N_\chi\phi_\chi \leq \phi_{EGRET}$$

Results

Scanning the physical mass range for the neutralino

$$M_\chi \sim 50 \div 5000 \text{ GeV}$$

for a given choice of the detectability threshold: ex.

$$\chi_r^2 \geq 2$$

we obtain for every annihilation channel (corresponding to different “regime” for the neutralino) a linear relation between the normalization ratio N_χ/N_b and the neutralino mass M_χ

Developments

1. Extract more data for the diffuse background (*Mayer-Hasselwander*)
2. Compare with *Strong and Moskalenko*
3. Glast features as a function of the energy E_γ
4. Realistic susy models (MSSM or mSUGRA)