On the possibility of a symmetric matter-antimatter universe

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Matter and antimatter

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But...

- Still not validated!

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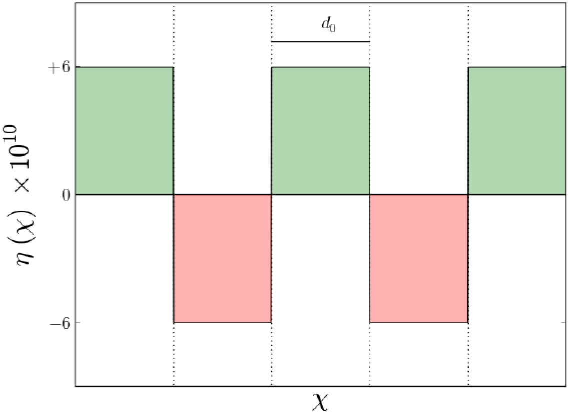
- There is a interface region.

The Cohen, De Rújula, Glashow argument (CDG)

COHEN, DE RUJÙLA & GLASHOW, 1998



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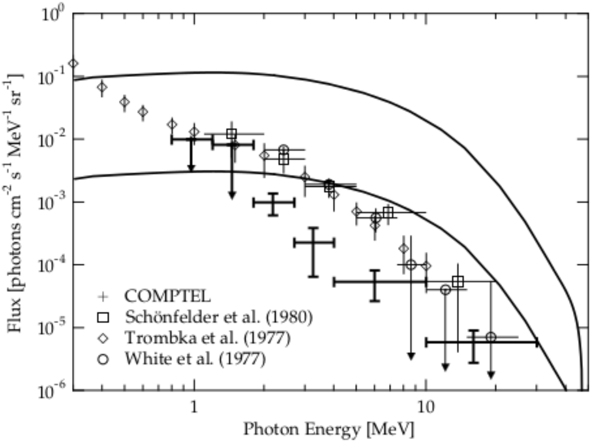
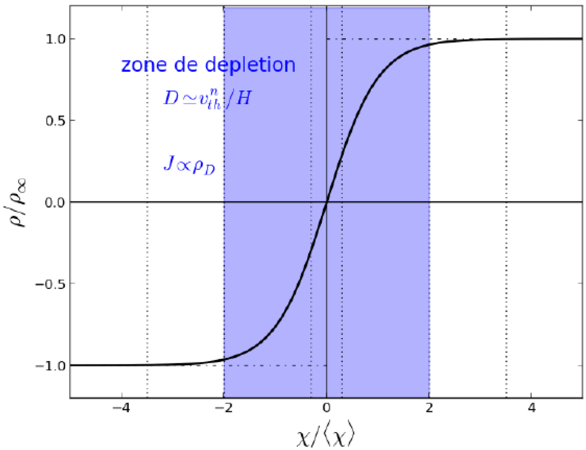
- Heat the region around the interface
- Produce Gammas..

The Cohen, De Rújula, Glashow argument (CDG)



$D \sim 20$ Mpc and $D \sim 1000$ Mpc

Physics of the annihilation regions



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Size and flux

- The comoving size of the annihilation region λ_a^c :

$$\lambda_a^c \approx (1+z)\frac{v_{th}}{H(z)} \approx 10 \left(\frac{300}{1+z}\right)^{1/2} h^{-1}\mathrm{kpc}$$

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- The background flux is proportional to the number of annihilation events J:

$$J \sim n_p v_{th}(z)$$

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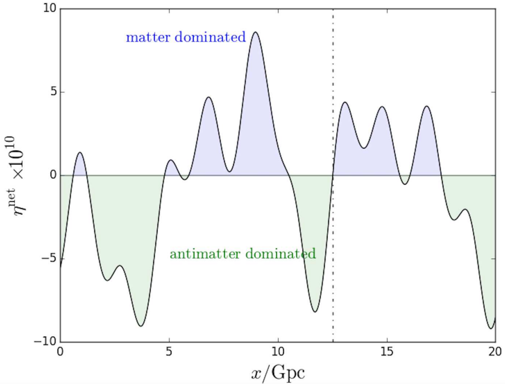

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Conclusion at this point

The cosmic diffuse gamma background constraint is relaxed.

What's next?

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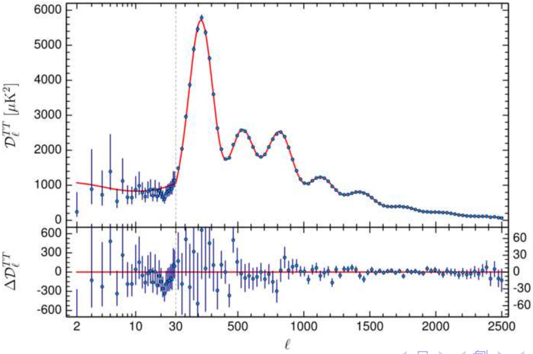
Planck CMB $\mathcal{C}_\ell$



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- On large scales each region (>patch) has an average $n_B \sim$ producing $\mathcal{C}_\ell$ of constant n_B.
- That is:

$$\langle C_\ell^{\sigma_B} \rangle = \frac{\sum p_{\sigma_B}(\omega_B) \cdot C_\ell(\omega_B)}{\sum p_{\sigma_B}(\omega_B)}$$

$p_{\sigma_B}(\omega_B)$ being a gaussian distribution of n_B.

Resulting C_ℓ

Two parameters: σ_B and amplitude Υ

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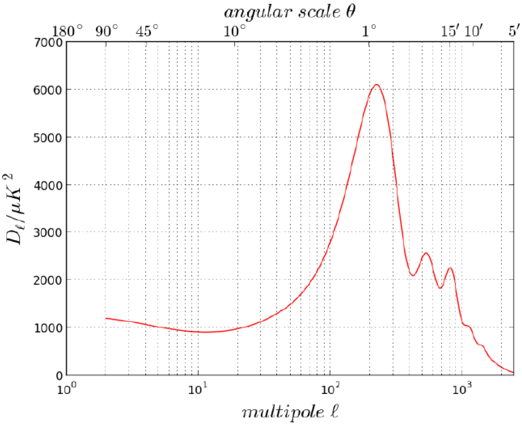

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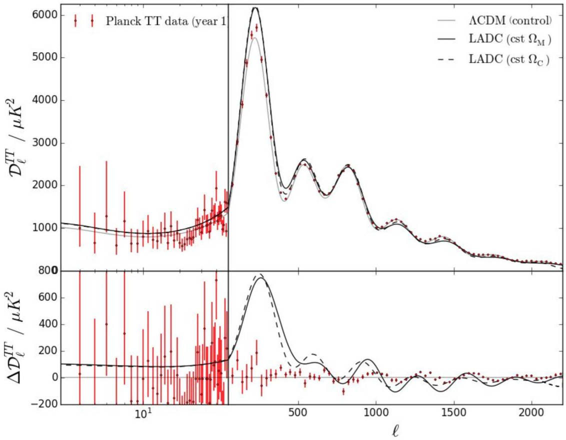

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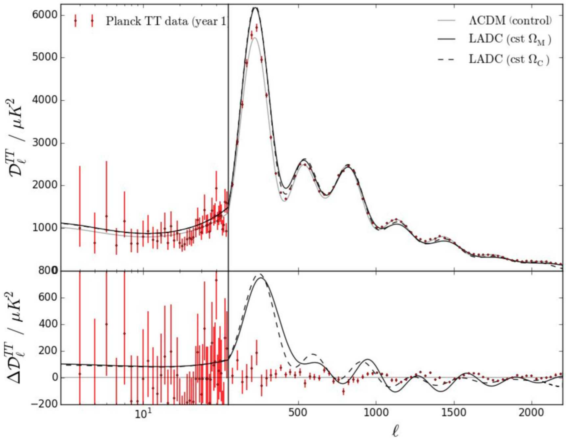

$$\chi^2 \sim 3450 \text{ while } \chi^2 \sim 1030 \text{ for LCDM}$$

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Thank You