ON THE POSSIBILITY OF A HIGHER BARYONIC CONTRIBUTION TO DARK MATTER

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The most stringent constraint against baryonic dark matter is provided by primordial nucleosynthesis. Agreement between theory and observations is reachedonly for a limited range of the baryon-to-photon ratio η_B, namely $\eta_B^{min} \simeq 3 \times 10^{-10} \leq \eta_B \leq 10^{-9} \simeq \eta_B^{max}$ (1), which implies that, in standard cosmological frameworks, the universe cannot be closed by baryons.

We have carried out an evaluation of the light element yields when an exponential injection of antimatter occurs at high temperatures. This is the kind of antimatter appearence to be expected when it is produced through hadronic decays of a population of generic exotic particles (2,3).

Results of our calculations show that nuclei disruption by antimatter strongly affects light nuclei production, mainly when this process occurs while nuclear reactions are effective. It has been found (4) that a region of the parameters of the model (the abundance and the lifetime of the exotic particles) exists where D, ^{3}He, ^{4}He and ^{7}Li are consistently synthetized for $\eta_B > \eta_B^{max}$, and even for $\Omega_B = 1$. We conclude that the baryonic contribution to dark matter could be higher that what is commonly assumed.

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