



## PLASMAS E ALTAS ENERGIAS

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### ANTIPROTONS IN COSMICS RAYS: WHAT DO THEY TELL US?

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High-energy collisions of cosmic-ray (CR) nuclei with interstellar gas are believed to be the mechanism producing the majority of CR antiprotons. The secondary production of antiprotons and contributions of tertiary component and antineutron decay is calculated utilizing the computer code SHIELD of nuclear reaction simulations (Dementyev and Sobolevsky, 1999). The propagation of CR antiprotons in the Galaxy is performed in the framework of the diffusion model. To calculate the effect of the solar modulation in the heliosphere the convection-diffusion approximation is used. Recent measurements of the CR antiprotons flux showed excesses compared with the current conventional theoretical predictions, in energies sub-GeV. This may indicate an additional local CR antiproton component, a new phenomena in CR propagation in the Galaxy, or even a new physics. Thus, accurate calculation of the secondary antiproton flux provides a "background" for searches of exotic signals from the annihilation of supersymmetric particles and primordial black hole evaporation. Another main question in cosmology is the existence of a possible asymmetry between matter and antimatter. The observation of antiprotons and, more generally, of antinuclei in the CR provides a unique direct evidence of antimatter presence in the Universe. A new generation of space experiment for the precision measurements of CR like PAMELA, AMS-02 and BESS-polar will supply information to understand of cosmic antimatter flux.