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New Markov-Chain Monte Carlo analyses for the evaluation of the antiproton background

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Galactic cosmic rays (GCRs) undergo diffusion by plasma wave interactions, nuclear reactions with interstellar gas and other processes during their propagation. A good knowledge in the spallation cross sections is a key ingredient to study this diffusion since the formation of secondary CRs keeps track of the amount of matter traversed. In this work, we perform different analyses of the diffusion parameters that best match the most recent CR data from the AMS-02 experiment for different spallation cross sections parameterizations. The simulations will be performed with a preliminary version of the upcoming DRAGON2 code and the analysis is carried out with a Markov-Chain Monte Carlo algorithm.

Recent CR antiproton studies have claimed the possibility of an excess of data over the predicted flux, which can be the signature of annihilation or decay of a dark matter particle with a mass around 80 GeV into antiprotons. We will derive the antiproton spectra predicted by the propagation parameters inferred from our MCMC analyses in order to evaluate, for first time, the uncertainties associated to the spallation cross sections in the antiproton predictions and test their compatibility with antiproton data.

Primary author(s) : DE LA TORRE LUQUE, Pedro (University of Bari)

Co-author(s) : Mr. SERINI, Davide (INFN sezione Bari); Prof. GARGANO, Fabio (INFN sezione Bari); Prof. LOPARCO, Francesco (INFN sezione Bari); Prof. MAZZIOTTA, Nicola (INFN sezione Bari)

Presenter(s) : DE LA TORRE LUQUE, Pedro (University of Bari)

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