Spectrum of the galactic secondary antiprotons with the tertiary component

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The interstellar antiprotons observed near the Earth are known as a secondaries produced in the nuclear reactions of cosmic rays (CR) with the interstellar matter. This conclusion is a result of a comparison between the measured and modeled antiproton fluxes. Further improvement of the modeling could lead to the reconsideration the recent conclusion about absence of the natural sources of antiparticles in the Galaxy. The numerical simulation of interstellar antiproton flux now reaches its most perfect development in mathematic GALPROP code created by Strong and Moskalenko (1998) which accounts all mechanisms (diffusion, convection, reacceleration etc processes) and astrophysical models for particle propagation in the Galaxy and all particle losses which one only can imagine. We challenged to this modeling, computing interstellar antiproton fluxes on the base of the empirical nuclear reaction SHIELD code developed in Moscow Nuclear Physics Institute, different from the antiproton production cross section code utilized by GALPROP. However, as a propagation model we utilize the old, well-earned "the leaky-box" model which permits to include easily and clearly understand an importance of various processes of particle losses and sources. We account tertiary antiproton flux as a new source of low energy antiprotons appearing as a result of inelastic scattering of secondary antiprotons on the interstellar gas. The resulting computed interstellar antiproton fluxes are less than those obtained on the base of GALPROP code. At low energy range they are lower than measured antiproton fluxes, that hints on possible existence of the primary antiproton sources. Strong, A.W., and Moskalenko, I.V. 1998, ApJ, 509, 212.

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