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Astrophysical background and dark matter implication based on latest AMS-02 data

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The cosmic ray(CR) positrons and antiprotons are often regarded as the products of collisions of CR nucleons with the interstellar medium. However this conclusion is challenged by recent experimental data. In this work, we choose the latest AMS-02 data to analyze the astrophysical background of CR positrons and antiprotons based on the GALPROP code for CR propagation and QGSJET-II-04 for hadronic CR interactions. The results show that in low energies the flux of CR antiprotons is consistent with AMS-02 data, and the over-predicted flux of CR positrons is well reduced in a diffusion model combining the re-acceleration and convection terms. Using this model, the calculated flux of CR protons is consistent with AMS-02 data with the hardening feature above 330 GeV. Based on this model, using the total fluxes of CR electrons and positrons from AMS-02, interpretation of dark matter annihilation on the positron excess are also analyzed.

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