

Cosmic Ray Excesses from Multi-component Dark Matter Decays

AMS-02 collaboration published their measurement on the positron fraction in the cosmic rays, confirming the excesses by PAMELA. Also, the Fermi-LAT data on the total $e^+ + e^-$ flux also showed excess above 20 GeV. In this talk, I shall show that the multi-component decaying dark matter (DM) scenario can naturally explain these two anomalies. By performing the χ^2 fits, we find that two DM components are already enough to give a reasonable fit of both AMS-02 and Fermi-LAT data. As a byproduct, the fine structure around 100 GeV observed by AMS-02 and Fermi-LAT can be naturally explained by the dropping due to the lighter DM component. With the obtained model parameters by the fitting, we calculate the diffuse γ -ray emission spectrum in this two-component DM scenario, and find that it is consistent with the data measured by Fermi-LAT. Finally, a microscopic particle DM model is constructed to naturally realize the two-component DM scenario, which points out an interesting neutrino signal which is possible to be measured in the near future by IceCube.

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