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Vela-X as main contributor to the electron and positron spectra at energy above 100 GeV

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The precise measurements of the electron, positron and electron plus positron spectra, in the energy range from 0.5 GeV up to 700 GeV, 500 GeV and 1 TeV respectively, were published by the AMS-02 collaboration. We focus the attention above 10 GeV where the solar modulation effects are negligible. The differences between these data and the “classical” Local Interstellar Spectra, obtained using optimized GALPROP parameters, show an extra contribution suggesting an equal amount for both electrons and positrons. Thus, they would be produced by a pair production process from the same source. We studied the contribution from Vela-X Pulsar Wind Nebula starting from the photon spectrum (due to synchrotron and inverse Compton processes) detected by gamma-ray telescopes. A diffusion model is applied from the source up to the Solar System and the propagated spectra are compared with the AMS-02 data. Above 100 GeV, Vela-X is the main candidate to contribute to the observed excess.

Collaboration

– not specified –

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