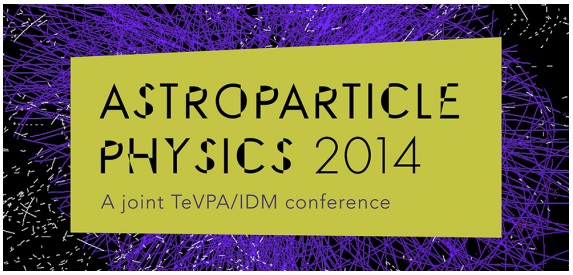

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Cosmic Rays, Synchrotron Emission and Diffuse Galactic Gamma Rays: Consistent Analysis and Impications

Monday, June 23, 2014 5:49 PM (18 minutes)

Fairly poor knowledge is still present about the cosmic ray (CR) spectra at low energies, due to the distortion produced by the solar wind on the particle fluxes. A self-consistent galactic plus solar propagation model turns out necessary in order to correctly reproduce the CR nuclear and lepton spectra.
For that, a detailed transport description in the galaxy has been numerically
implemented in a full three-dimensional code (DRAGON), to compute the local interstellar spectra (LIS) of several CR species.
Then, we propagate the charged particles in the heliosphere,
where charge-sign dependent motion effects are taken in account.
Going beyond the standard force-field solar modulation,
we are able to interpret the data available nowadays.
In particular the hadron and lepton spectra provided by observations at Earth,
from the PAMELA and AMS-02 missions.
In a multichannel analysis of cosmic ray electron and positron
spectra, we therefore study the diffuse synchrotron emission of the Galaxy.
Below 4 GeV, we find that the electron primary spectrum is significantly suppressed so that the low-energy total spectrum will turn out to be dominated by secondary particles.
Finally, we investigate the high latitude (|b| >10 deg) diffuse gamma-ray emission in the Galaxy in light of the recently published data from the Fermi-Lat Collaboration, at energies between 100 MeV and 100 GeV.

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