



Contribution ID: 45

Type: **not specified**

Cosmic-ray propagation with GALPROP

Wednesday 15 June 2011 10:15 (35 minutes)

Cosmic-ray origin and propagation can be studied using a broad range of experimental data. These include direct measurements from balloons and satellites, gamma rays, synchrotron radiation, ionization in molecular clouds, and so on. It is important that a consistent framework be used for such studies, since all the data relate to the same Milky Way galaxy. Since the mid-1990s the GALPROP project has developed a numerical model for cosmic-ray propagation which endeavours to be as realistic as possible, using astronomical data for Galactic structure and predicting a wide range of relevant observables in a unified model. The numerical approach avoids the restrictions of analytical models. I will describe GALPROP including its history and motivation, and compare it with other approaches. Recent results, in particular from Fermi and on synchrotron radiation, will be presented. In the context of this conference, such models provide a solid physical basis for foreground predictions for indirect DM studies.

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