



ID de Contribution: 55

Type: **Non spécifié**

Diffuse galactic gamma-ray emission

jeudi 30 juin 2011 14:40 (20 minutes)

The Galactic gamma-ray diffuse emission is currently observed in the GeV-TeV energy range with unprecedented accuracy by the Fermi satellite. Understanding this component is crucial as it provides a background to many different signals such as extragalactic sources or annihilating dark matter. It is timely to reinvestigate how it is calculated and to assess the various uncertainties which are likely to affect the accuracy of the predictions. The Galactic gamma-ray diffuse emission is mostly produced above a few GeV by the interactions of cosmic ray primaries impinging on the interstellar material. The theoretical error on that component is derived by exploring various potential sources of uncertainty. Particular attention is paid to cosmic ray propagation. Nuclear cross sections, the proton and helium fluxes at the Earth, the Galactic radial profile of supernova remnants and the hydrogen distribution can also severely affect the signal. The propagation of cosmic ray species throughout the Galaxy is described in the framework of a semi-analytic two-zone diffusion/convection model. This allows to convert the constraints set by the boron-to-carbon data into a theoretical uncertainty on the diffuse emission. New deconvolutions of the HI and CO sky maps are also used to get the hydrogen distribution within the Galaxy. The thickness of the cosmic ray diffusive halo is found to have a significant effect on the Galactic gamma-ray diffuse emission while the interplay between diffusion and convection has little influence on the signal. The uncertainties related to nuclear cross sections and to the primary cosmic ray fluxes at the Earth are significant. The radial distribution of supernova remnants along the Galactic plane turns out to be a key ingredient. As expected, the predictions are extremely sensitive to the spatial distribution of hydrogen within the Milky Way. Most of the above mentioned sources of uncertainty are likely to be reduced in the near future. The stress should be put (i) on a better determination of the thickness of the cosmic ray diffusive halo and (ii) on refined observations of the radial profile of supernova remnants.

Orateur: Dr DELAHAYE, Timur (IFT-Madrid)

Classification de Session: Diffuse emission and cosmic ray interaction with interstellar matter