COSMIC RAYS BELOW $Z = 30$ IN A DIFFUSION MODEL: NEW CONSTRAINTS ON PROPAGATION PARAMETERS.

D. Maurin (1), F. Donato (2), **R. Taillet** (1) and P. Salati (1)
(1) Laboratoire de Physique Théorique LAPTH, Annecy–le–Vieux, 74941 and Université de Savoie, Chambéry, 73011, France., (2) Laboratoire de Physique Théorique LAPTH, Annecy–le–Vieux, 74941, France .

Cosmic ray nuclei fluxes are expected to be measured with high precision in the near future. For instance, high quality data on the antiproton component could give important clues about the nature of the astronomical dark matter. A very good understanding of the different aspects of cosmic ray propagation is therefore necessary. In this paper, we use cosmic ray nuclei data to give constraints on the diffusion parameters. Propagation is studied with semi–analytical solutions of a diffusion model, and we give new analytical solutions for radioactively produced species. Our model includes convection and reacceleration as well as the standard energy losses. We perform a χ^2 analysis over B/C data for a large number of configurations obtained by varying the relevant parameters of the diffusion model. A very good agreement with B/C data arises for a number of configurations, all of which are compatible with sub–Fe/Fe data. Different source spectra $Q(E)$ and diffusion coefficients $K(E)$ have been tried, but for both parameters only one form gives a good fit. Another important result is that models without convection or without reacceleration are excluded. We find that the various parameters, *i.e.* the diffusion coefficient normalisation K_0 and spectral index δ, the halo thickness L, the Alfvén velocity V_a, and the convection velocity V_c are strongly correlated. We obtain limits on the spectral index δ of the diffusion coefficient, and in particular we exclude a Kolmogorov spectrum ($\delta = 1/3$).