ICRC'07

Mérida, Yucatán, Méx.

Contribution ID : **52**   Type : **Oral**

Uncertainties in Indirect Dark Matter Searches with Charged Cosmic Rays

Tuesday, 10 July 2007 08:42 (0:12)

Abstract content

The annihilation of relic Dark Matter(DM) in the galactic halo leads to a new primary source of gamma rays, positrons and antiprotons, which may be observed as an excess on top of the cosmic rays (CR) background calculated within a galactic model. With assumptions of isotropic propagation and smooth gas distribution the uncertainties in the prediction of local CR fluxes do not exceed 20%. However, the gas distribution is known to be clumpy, which can result in large small scale variations in propagation parameters. The DM distribution can be clumpy too which introduce an additional uncertainties in the fluxes from annihilation. On larger scales the propagation can be anisotropic due to convective wind which may strongly vary with position in the Galaxy. These uncertainties have been studied with the publicly available GALPROP propagation code modified to include DM annihilation and anisotropic propagation in large and small scales. The uncertainties in the fluxes of charged particles, have been found to be large and with some assumptions can explain the EGRET gamma excess and the observed CR fluxes simultaneously, by annihilation of 50-100 GeV neutralino.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 697-700

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Session Classification :   HE 3.3

Track Classification :   HE.3.3