ICRC'07

Mérida, Yucatán, Méx.

Contribution ID : **699**   Type : **Poster**

Maximum Likelihood Method for 2-D Gamma Ray Source Detection

Monday, 9 July 2007 14:45 (0:00)

Abstract content

In the analysis of Imaging Air Cerenkov Telescope (IACT) data, offset and/or extended source observations require more sophisticated schemes for determining the presence and statistical significance of any excess gamma ray signal than the standard Li and Ma On-Off technique that has been conventionally used in the analysis of point sources. Although arrays of multiple telescopes have much less background contamination than a single IACT, they cannot eliminate all the background. In this paper we present a maximum likelihood method for determining both the presence and statistical significance of a possible gamma ray source in a field of non-zero background events. The method utilizes the ratio of the likelihood function under two hypotheses: first that the data can be explained by a pure background model and second that a source is present on top of the background, its strength given by maximization of the likelihood function. The method requires detailed knowledge of the detector response to background events, and the gamma ray point spread function in the detector. It produces a value for the signal strength along with the probability that the signal is inconsistent with being due to background alone.

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. 3 (OG part 2), pages 1409-1412

Primary author(s) :   Dr. SEMBROSKI, Glenn (Purdue University)

Co-author(s) :   Dr. KERTZMAN, Mary (DePauw University); Dr. FEGAN, Stephen (University of California Los Angeles)

Presenter(s) :   Dr. SEMBROSKI, Glenn (Purdue University)

Session Classification :   Posters 3 + Coffee

Track Classification :   OG.2.7