

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

A morphology-independent search for extended TeV gamma-ray sources RUO YU SHANG, VLADIMIR VASSILIEV, University of California, Los Angeles — We present a new background estimation method for a search for largely extended TeV gamma-ray sources with instruments of the imaging atmospheric Cherenkov technique. Gamma-ray and background cosmic ray air shower events are characterized by two shape parameters, mean-scaled length and width, and the distribution of which is represented by a matrix (the mean-scaled length parameter is column-indexed and the mean-scaled width parameter is row-indexed). The signal region of the matrix defined by the shape parameters is blinded, and the background method utilizes the unblinded entries of the matrix to recover the background distribution in the blinded signal-region entries. This new method is demonstrated using the examples of signal-free VERITAS (Very Energetic Radiation Imaging Telescope Array System) data. This report includes comparisons with conventional background methods. The systematic uncertainty and the sensitivity of the new method are also provided. This new method is designed for largely extended gamma-ray sources whose angular sizes could be larger than the field of view of the instruments.

Ruo Yu Shang
University of California, Los Angeles

Date submitted: 08 Jan 2021

Electronic form version 1.4