

Observations of the Unidentified TeV $\hat{\Gamma}$ -Ray Source TeV J2032+4130 with the Whipple Observatory

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Sunday, 01 April 2007

Last Updated Thursday, 11 September 2008

The Astrophysical Journal, Volume 658, p. 1062

arXiv:astro-ph/0611730

Abstract: We report on observations of the sky region around the unidentified TeV γ -ray source (TeV J2032+4130) carried out with the Whipple Observatory 10 m atmospheric Cherenkov telescope for a total of 65.5 hrs between 2003 and 2005. The standard two-dimensional analysis developed by the Whipple collaboration for a stand-alone telescope reveals an excess in the field of view at a pre-trials significance level of 6.1σ . The measured position of this excess is $\alpha_{2000} = 20^{\text{h}} 32^{\text{m}} 27^{\text{s}}$, $\delta_{2000} = 41^{\circ} 39' 17''$. The estimated integral flux for this γ -ray source is about 8% of the Crab-Nebula flux. The data are consistent with a point-like source. Here we present a detailed description of the standard two-dimensional analysis technique used for the analysis of data taken with the Whipple Observatory 10 m telescope and the results for the TeV J2032+4130 campaign. We include a short discussion of the physical mechanisms that may be responsible for the observed γ -ray emission, based on possible association with known astrophysical objects, in particular Cygnus OB2.