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HAWC detection of increased TeV flux state for Markarian 501

ATel #8922; *Andrés Sandoval (IF-UNAM), Robert Lauer (UNM), Joshua Wood (UMD) on behalf of the HAWC collaboration*

on 7 Apr 2016; 23:38 UT

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The HAWC Observatory measured an increased gamma-ray flux from the direction of the BL Lac Markarian 501 ($z=0.033$) at the level of $(4.88 \pm 1.05) \times 10^{-11}$ photons $\text{cm}^{-2} \text{s}^{-1}$ above 1 TeV when averaged during the 6 hour transit over HAWC on April 6, 2016 (MJD 57484.31 - 57484.56) which is 2.2 times the average Crab flux observed by HAWC. For the following transit on April 7, 2016 (MJD 57485.30 - 57485.55), a decreased but still above-average flux of $(2.78 \pm 0.09) \times 10^{-11}$ photons $\text{cm}^{-2} \text{s}^{-1}$ was observed, 1.3 times the Crab flux seen by HAWC. The flux on April 6 lies 4 sigma above the average flux of 0.89×10^{-11} photons $\text{cm}^{-2} \text{s}^{-1}$ that was measured for this source by HAWC during the previous year. The flux level on April 7 is 2 sigma above this average and seems to indicate a declining but on-going high flux state. All flux values are obtained from a maximum likelihood fit under the assumption of a fixed spectral shape with power law index of 1.8 and exponential cut-off at 6 TeV. These spectral parameters are the best fit results for HAWC data from Markarian 501 collected between November 2014 and December 2015. HAWC is a TeV gamma ray water Cherenkov array located in the state of Puebla, Mexico that monitors 2/3 of the sky every day with an instantaneous field of view of ~ 2 sr. The HAWC contact people for this analysis are Robert Lauer (University of New Mexico, rjlauer@unm.edu) and Michelle Hui (Marshall Space Flight Center, c.m.hui@nasa.gov).

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