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Constraining photon dispersion relation from observations of the Vela pulsar with H.E.S.S

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Constraining photon dispersion relation from observations of the Vela pulsar with H.E.S.S

M.Chrétien, J. Bolmont, A. Jacholkowska, for the H.E.S.S. collaboration

Some approaches to Quantum Gravity (QG) predict a modification of the dispersion relations also known as a Lorentz Invariance Violation. The effect is expected to affect photons near an effective QG energy scale. This value has been constrained by observing gamma rays emitted from variable astrophysical sources such as gamma-ray bursts and flaring active galactic nuclei. Pulsars are periodic transient sources with an extreme variability of ms time scale. In 2014, the H.E.S.S. experiment reported the detection above 30 GeV of gamma rays emitted every 89 ms from the Vela pulsar. Using a likelihood analysis, calibrated with a dedicated Monte-Carlo procedure, we obtain the first limit on QG energy scale with the Vela pulsar. In this talk, the method and calibration procedure in use will be described and the results will be discussed.

Collaboration

H.E.S.S.

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Primary author: CHRÉTIEN, Mathieu (LPNHE CNRS/IN2P3)**Co-authors:** Dr JACHOLKOWSKA, Agnieszka (LPNHE CNRS/IN2P3); Dr BOLMONT, Julien (LPNHE UPMC/IN2P3)**Presenter:** CHRÉTIEN, Mathieu (LPNHE CNRS/IN2P3)**Session Classification:** Parallel GA03 Pulsars**Track Classification:** GA-EX