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Constraints on Lorentz Invariance Violation from MAGIC observation of GRB 190114C

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On January 14th 2019, MAGIC, a stereoscopic system of two 17m diameter Imaging Atmospheric Cherenkov Telescopes located on the Canary island of La Palma, observed for the first time a gamma-ray burst (GRB) at TeV energies, namely GRB 190114C. MAGIC measurements started ˜60s after the onset of GRB 190114C, predominantly in the featureless smooth afterglow phase. Nevertheless, in the first 30s of MAGIC observation the gamma-ray intensity from GRB 190114C reached the unprecedented level of around 130 times the Crab nebula flux. Such GRB observations are regarded as one of the best targets to test quantum gravity models, several of them predicting an energy dependence of the speed of light that can be probed thanks to the cosmological distances traveled by the emitted photons and the time variability of the emission. In this talk, we will report on the search of such LIV effect using a maximum likelihood analysis of the GRB 190114C observation by MAGIC.

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