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TeV gamma-ray variability and duty cycle of Mrk 421 as determined by 3 Years of Milagro monitoring

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The blazar Mrk 421 is one of the brightest extragalactic TeV gamma-ray sources. Like the other TeV blazars, it presents flaring episodes in both X-rays and TeV gamma-rays. A correlation has been observed between the emissions in these two energy bands, although not all X-ray flares have been associated with a simultaneous increase in the TeV flux.

Milagro was a TeV gamma-ray detector located near Los Alamos, New Mexico. It used the water Cherenkov technique to detect extensive air-showers produced by very high energy (VHE, > 100 GeV) gamma rays as they interact with the Earth's atmosphere.

Here we report on the long term TeV gamma-ray monitoring of Mrk 421 with Milagro. The source was detected with a statistical significance of 7.1 standard deviations over the period from September 2005 to March 2008. We present the study of the variability of Mrk 421 and provide upper limits on the flux; furthermore, we estimate the gamma-ray duty cycle of the source and compare it with the X-ray duty cycle.

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