The TeV Energy Spectrum of Mrk 421 Measured in a High Flaring State

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The BL Lac object (blazar) Mrk 421 was observed in a high emission state in April 2005 with the Whipple 10 m telescope for about 24.5 hrs. The measured gamma-ray rate varied substantially over the range of 4 to 10 γ's/min and eventually exceeded the steady γ-ray rate of the Crab Nebula (the standard candle) by a factor of 3. The overall significance of the gamma-ray signal reached 50σ and the total number of excess events was more than 10,000. The Mrk 421 light curve does not display any distinct variability pattern. This unique Mrk 421 outburst enabled the measurement of a high precision very high-energy γ-ray spectrum. The spectrum extends beyond 10 TeV and severely constrains the spectral energy distribution of the extra-galactic background light.

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