

MAGIC and H.E.S.S. detect VHE gamma rays from the blazar OT081 for the first time: a deep multiwavelength study

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OT081 is a luminous blazar well known for its variability in many energy bands.

The very-high-energy (VHE, $E > 100$ GeV) gamma-ray emission from the source was discovered by MAGIC and H.E.S.S. during flaring activity in July 2016, after a trigger from the LAT onboard the Fermi satellite.

From the analysis of the multiwavelength (MWL) light curves and of the broadband spectral energy distribution (SED), we study the activity of the source, in particular during four identified states of activity in the window MJD 57575 to MJD 57600. The intrinsic gamma-ray spectrum can be described by a power law with spectral indices of 3.27 ± 0.44 (MAGIC) and 3.39 ± 0.58 (H.E.S.S.) for energy ranges 60-300 GeV and 120-500 GeV, respectively.

The combined contemporaneous HE ($E > 100$ MeV) through VHE SED shows curvature and can be described by a log-parabola shape.

VLBI analysis of the flare reveals the ejection of a superluminal knot and its subsequent passage through a stationary feature as a possible cause of the HE gamma-ray activity.

A simple one-zone synchrotron self-Compton (SSC) model is not sufficient to describe the broadband SED, and external Compton is required to explain the high Compton dominance displayed by the source.

The presence of broad emission lines in the optical spectrum of the source challenges the categorization of OT081 as a BL Lac and, together with the emission scenarios tested, points to the possibility that the source is transitional in nature between a BL Lac and a flat spectrum radio quasar (FSRQ).

Keywords

galaxies: active; BL Lacertae objects: individual: OT-081; gamma-rays; galaxies: non-thermal; galaxies: FSRQ; AGN; multiwavelength; multi-wavelength;

Collaboration

MAGIC

other Collaboration

H.E.S.S., Fermi-LAT

Subcategory

Experimental Results

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