

## Multiwavelength behaviour of the blazar OJ 248 from radio to $\gamma$ -rays

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### Abstract

© 2015 The Authors. We present an analysis of the multiwavelength behaviour of the blazar OJ 248 at  $z = 0.939$  in the period 2006-2013. We use low-energy data (optical, near-infrared, and radio) obtained by 21 observatories participating in the Gamma-Ray Large Area Space Telescope (GLAST)-AGILE Support Program of the Whole Earth Blazar Telescope, as well as data from the Swift (optical-UV and X-rays) and Fermi ( $\gamma$  -rays) satellites, to study flux and spectral variability and correlations among emissions in different bands. We take into account the effect of absorption by the Damped Lyman  $\alpha$  intervening system at  $z = 0.525$ . Two major outbursts were observed in 2006-2007 and in 2012-2013 at optical and near-IR wavelengths, while in the high-frequency radio light curves prominent radio outbursts are visible peaking at the end of 2010 and beginning of 2013, revealing a complex radio-optical correlation. Crosscorrelation analysis suggests a delay of the optical variations after the  $\gamma$  -ray ones of about a month, which is a peculiar behaviour in blazars. We also analyse optical polarimetric and spectroscopic data. The average polarization percentage  $P$  is less than 3 per cent, but it reaches  $\sim 19$  per cent during the early stage of the 2012-2013 outburst. A vague correlation of  $P$  with brightness is observed. There is no preferred electric vector polarization angle and during the outburst the linear polarization vector shows wide rotations in both directions, suggesting a complex behaviour/structure of the jet and possible turbulence. The analysis of 140 optical spectra acquired at the Steward Observatory reveals a strong Mg II broad emission line with an essentially stable flux of  $6.2 \times 10^{-15}$  erg cm $^{-2}$  s $^{-1}$  and a full width at half-maximum of 2053 km s $^{-1}$ .

<http://dx.doi.org/10.1093/mnras/stv823>

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### Keywords

Galaxies: active, Galaxies: jets, Quasars: general, Quasars: individual: OJ 248