

VARIABILITY CHARACTERISTICS OF BLAZAR OJ 287

L.O. TAKALO¹, A. SILLANPÄÄ¹, T. PURSIMO¹, H.J. LEHTO¹,
K. NILSSON¹, P. TEERIKORPI¹, P. HEINÄMÄKI¹, M. KIDGER²,
J.A. DE DIEGO², T. MAHONEY², J.-M. RODRÍGUEZ-ESPINOSA²,
J.N. GONZÁLEZ-PÉREZ², P. BOLTWOOD³, D. DULTZIN-HACYAN⁴,
E. BENITEZ⁴, G. TURNER⁵, J. ROBERTSON⁵, R. HONEYCUT⁵,
YU.S. EFIMOV⁶, N. SHAKHOVSKOY⁶, P. A. CHARLES⁷, D. KÜHL⁸,
K.J. SCHRAMM⁸, U. BORGEEST⁸, J.V. LINDE⁸, W. WENEIT⁸,
T. SCHRAMM⁸, A. SADUN⁹, R. GRASHUIS¹⁰, J. HEIDT¹¹, H. BOCK¹¹,
S. WAGNER¹¹, M. KÜMMEL¹¹, A. HEINES¹¹, M. FIORUCCI¹²,
G. TOSTI¹², C. RAITERI¹³, M. VILLATA¹³, G. LATINI¹³, S. BOSIO¹³,
G. GHISELLINI¹³ AND G. DE FRANCESCO¹³

¹ *Tuorla Observatory, FIN-21500 Piikkiö, Finland*

² *Instituto de Astrofísica de Canarias, La Laguna, Tenerife, Spain*

³ *1655 Main St. Stittsville, Ont. K2S 1N6, Canada*

⁴ *Instituto de Astronomía-UNAM, Apdo. Postal 70-264, 04510, Mexico, D.F. Mexico*

⁵ *Department of Astronomy, Indiana University, Swain West 319, Bloomington, IN 47405, USA*

⁶ *Crimean Astrophysical Observatory, P/O Nauchny, 334413 Crimea, Ukraine*

⁷ *University of Oxford, Dept. of Astrophysics, Keble Road Oxford, OX1 3RH, England*

⁸ *Hamburger Sternwarte, Hamburg Universität, Gojenbergweg 112, D-21029 Hamburg 80, Germany*

⁹ *Bradley Observatory, Agness Scott College, Decatur, GA 30030, USA*

¹⁰ *Capilla Peak Observatory, Albuquerque, NM 87131, USA*

¹¹ *Landessternwarte Königstuhl, D-69117 Heidelberg, Germany*

¹² *Osservatorio Astronomico, Università di Perugia, I-601123 Perugia, Italy*

¹³ *Osservatorio Astronomico di Torino, Strada Osservatorio 20, I-10025, Pino Torinese, Italy*

Blazar OJ 287 is one of the best observed extragalactic objects. Its historical light curve goes back to 1890's. Based on the historical behaviour Sillanpää et al. (1988) showed that OJ 287 displays large periodic outbursts, with a period of 11.7 years. We have monitored OJ 287 intensively for two years, during the OJ-94 project. This project was created for monitoring OJ 287 during its predicted new outburst in 1994. In the data archive we have over 7000 observations on OJ 287, in the radio, infrared and optical bands. This data archive contains the best ever obtained light curves for any extragalactic object. The optical light curve shows continuous variability down to time scales of tens of minutes. The variability observed in OJ 287 can be broken down to (at least) four different categories:

1. The large outbursts that occur every 11.7 years. The last one of these happened during November 1994, almost at the predicted time. These outbursts can be due to the binary black hole model proposed by Sillanpää et al. (1988).

2. There are quite frequent, but randomly occurring flares that last from a few days to two weeks. During the project we have observed ten such flares, with the flare amplitudes ranging from half to over one magnitudes. These flares seem to have a synchrotron origin, being probably caused by shocks in the jet.

3. Small amplitude "flickering", that is present all the time. Time scales for this ranges from tens of minutes to hours, and the amplitude from 0.2 to 0.5 magnitudes. This flickering can be due to some instabilities in the jet or in the accretion disk.

4. Microvariability, that is seen occasionally. There is no clear correlation between it and the other variations. This microvariability can be due to the same events that cause the flickering.

References

Sillanpää, A., et al. (1988), *ApJ*, Vol. **325**., pp. 628-634