An X-ray/VHE Multiwavelength Study of Mkn 501 During Its Extraordinary Outburst of 1997

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During more than 6 months in 1997, the BL Lac object Mkn 501 was in an exceptionally bright state, both, in the X-ray band and in the Very High Energy (VHE) band. In this contribution we present a multiwavelength study of Mkn 501 during the outburst. We describe the analysis of a data base of X-ray observations acquired with the pointed X-ray telescopes on board the *Rossi X-Ray Timing Explorer* (RXTE) during April, May, and July, 1997. We combine this data set complemented with X-ray observations by Beppo SAX with detailed VHE spectral information obtained from simultaneous or nearly simultaneous observations with the stereoscopic Cherenkov telescope system of HEGRA (data for 24 days) and with the CAT telescope (data for one day). Several strong flares could clearly be resolved in both energy bands, making it possible to perform a detailed analysis of the correlations of the X-ray and VHE flux levels and spectra. We interpret our findings in the framework of a Synchrotron Self Compton model and study the constraints on the model parameters. We show that the emission mechanism predicts already a substantially curved VHE spectrum and discuss the implications for estimates of the intergalactic extinction due to pair production processes of the VHE photons on the Diffuse Extragalactic Background Radiation.