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Memorie della

e-VLBI observations of SN2001em – an off-axis GRB candidate

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Abstract.
Studying transient phenomena with the Very Long Baseline Interferometry (VLBI) technique faces severe difficulties because the turnaround time of the experiments from the observations to the scientific result is rather long. The e-VLBI technique has made it possible to transfer the data from a number of European VLBI Network (EVN) telescopes to the central data processor at JIVE through optical fibres, and correlate them in real time. The main goal of this paper is to introduce this rapidly developing new technique, by presenting observational results from a recent experiment. We observed SN2001em, a Type Ib/c supernova with an e-VLBI array and the Multi-Element Radio Linked Interferometer Network (MERLIN) in the UK. The source is marginally detected in our observations. We cannot make definite conclusions whether it is resolved at 1.6 GHz or not. Our data show that SN2001em either started fading in the last couple of months, or its radio spectrum is inverted at low frequencies, indicating free-free or synchrotron self-absorption. This is quite unusual, but not unprecedented in radio SNe.

Key words. Techniques: interferometry – Stars: supernovae: individual (SN2001em) – Radio continuum: general – Gamma rays: bursts

1. Introduction

There have been significant developments in the EVN in the recent years. Among these, the most substantial is the replacement of the MarkIV tape-based recording system with the Mark 5 Whitney (2003a,b) disk-based recording system. The advantages of disk recording are improved recording performance, and the possibility of monitoring the stations during the observations (e.g. transfer of small amounts of telescope data via the Internet, the so-called ftp fringe tests), which allows more robust operations. There is ongoing development to make the EVN operationally capable of electronic VLBI (e-VLBI), where the data are transfered to the correlator through opti-

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