



Search for transient radio sources near Galactic center region

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Abstract. We are summarizing our effort to search for transient radio sources near the center of Milky way using Giant Metrewave Radio Telescope (GMRT) and Very Large Array (VLA). We have detected two such sources in this region. Among these, GCRT J1745-3009 showed highly coherent emission with periodic pulse, very steep spectral index and variable circular polarization. The source GCRT J1742-3001 also showed steep spectral index.

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1. Introduction

The dynamic radio sky is not studied properly due to various reasons. There are plenty of sources which can show transient behavior in the radio wave band such as flare stars, brown dwarfs, neutron stars, black holes, supernovae, γ -ray bursts, active galactic nuclei etc. We are systematically searching for the transient radio sources in the central part of the Milky way using GMRT and VLA.

2. Results

We have discovered two transient radio sources near the Galactic Center region. The source GCRT J1745–3009 showed pulse like behavior with periodicity ~ 72 min (Hyman et al. 2005). The source was detected only three times and all detections were in 330 MHz. The first detection was using VLA in September 2002, the second and

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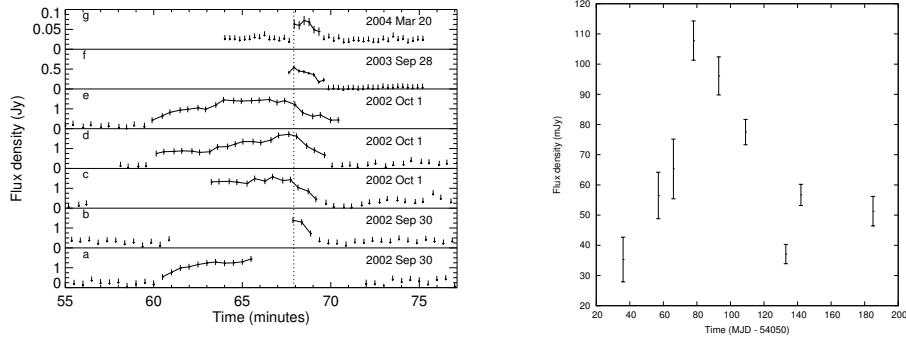


Figure 1. Light curve of GCRT J1745–3009 and GCRT J1742–3001 (Hyman et al. 2007; Hyman et al. 2009).

third detections were using GMRT in September 2003 and March 2004 respectively (Hyman et al. 2005, 2006, 2007; Roy et al. 2007). The source showed very high spectral index and variable circular polarization (Hyman et al. 2007; Roy et al. 2010). From the polarization variation time-scale, we put $8R_{\odot}$ as the upper limit of the size of the radio emission region. The source is emitting coherent emission with very high brightness temperature if located beyond 1pc. Detection of $\sim 100\%$ circular polarization also confirms coherent nature of the emission from the source.

The source GCRT J1742–3001 was located around 1 degree south from Galactic Center. The source was discovered using GMRT (Hyman et al. 2009). The radio emission reached the peak in about one month, reaching a peak observed flux density of ~ 100 mJy. The source had steep spectral index ($\alpha < 2$). The source was not detected by serendipitous observation obtained with the X-ray telescope aboard the Swift satellite close to the peak of radio emission of the source.

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