We report the discovery of a new radio transient, GCRT J1742-3001, detected at 235 MHz with the Giant Metrewave Radio Telescope. The transient was detected in our 2006-2007 monitoring observations of the Galactic center. It brightened and faded on a time scale of months, reaching a peak flux density of 100 mJy in early 2007. No detection was found in contemporaneous observations made by the Swift X-ray Telescope at the peak of the radio emission. We will discuss various models for the source including the possibility that GCRT J1742-3001 represents a new type of radio transient.

1 Summary

We are conducting a search for low frequency radio transients toward the Galactic center (GC) using monitoring and archival radio observations taken with the Very Large Array (VLA) and the Giant Metrewave Radio Telescope (GMRT) at 330 MHz and 235 MHz, respectively. Although transient radio emission has been detected from many previously discovered X-ray transient sources, there have been very few radio-initiated surveys for highly variable or transient sources. The high density of stars in the GC region, the steep spectra of known radio transients, and the wide field-of-view of low frequency observations increases the likelihood for detection of transient and variable radio sources. Recent improvements in data reduction techniques at low frequencies (e.g., excision of radio frequency interference, self-calibration, and wide-field, multi-faceted imaging), together with automated search methods for short timescale intra-observation transients, have enabled us to search more efficiently for transient radio sources.

We have detected at least three new radio transients for which no X-ray counterpart has been detected: 1) GCRT J1746-2757, with the VLA in 1998; 2) the bursting transient GCRT J1745-3009, with the VLA in 2002 and the GMRT in 2003 and 2004; and 3) GCRT J1742-3001, with the GMRT in 2006 and 2007, reported here. These discoveries bode well for the detection of many more transient sources with the new generation of low frequency radio telescopes currently being developed including LOFAR, the Low Frequency Array (LWA), and the MIRA Widefield Array (MWA).