

Radio brightening of Circinus X-1

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Recent X-ray observations of the X-ray binary Cir X-1 have revealed a brightening of the X-ray source (ATEL #2608) and the onset of type I X-ray bursts (ATEL #2643, ATEL #2651, ATEL #2653) confirming the neutron star nature of the source. Cir X-1 is a powerful jet source which in recent years has however faded to ~mJy levels in its core emission at GHz frequencies (compared to >Jy flux densities in the 1970s and 1980s). Observations in December 2009-January 2010 confirmed this trend. However, in the light of the recent X-ray activity we have performed further radio observations. Observations near predicted flaring/periastron on June 8 with the HartRAO facility indicated a flare possibly in excess of 0.5 Jy (at 8 GHz). Based on this we have made observations with the Australia Telescope Compact Array (ATCA) at the time of the next flaring period, on June 24. The ATCA observations last 12 hours and revealed a highly variable and bright radio source, peaking at 170+20 mJy at 5 GHz and 230+20 mJy at 8 GHz. The 8GHz peak appears to precede the 5 GHz peak by ~1.5 hours. We observe the decline of the flare for 6-7 hours after peak flux density, eventually dropping to 40+20 mJy at 5 GHz and 30+20 mJy at 8 GHz by the end of observations (24.79 Jun 2010). We re-observed 11 hours later to find that the source had risen to 60+20 mJy at 5 GHz and 80+20 mJy at 8 GHz where it remained for the 3 hour observation. This is the strongest radio emission observed ever observed from Cir X-1 by ATCA over nearly fifteen years, an order of magnitude stronger than when ATCA observations in 1998-2000 appeared to reveal an ultrarelativistic flow (Fender et al., Nature, 427, 222). This brightening indicates a dramatic increase in the jet power and/or a reduction in the angle to the line of sight. We are currently planning (e-) VLBI for this source and strongly encourage further observations at all wavelengths.