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Radio, Infrared and X-Ray Observations of GRS 1915+105

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Abstract.
We present multiwavelength observations of the superluminal jet source GRS 1915+105 in 1996 April–May, over which period a variety of phenomena, including radio QPO, strong infrared emission lines and rapid X-ray flickering and outbursts were observed.

1. Introduction

GRS 1915+105 is an energetic X-ray transient with associated relativistic jets (e.g. Mirabel & Rodriguez 1994). The source undergoes recurrent outbursts with correlated radio – X-ray behaviour (Foster et al 1996). There is no optical counterpart but spectroscopy of a variable infrared counterpart has revealed HI & HeI emission lines during a period of outburst (Castro-Tirada et al 1996).

GRS 1915+105 is now being monitored in the radio, soft & hard X-ray regimes by the Ryle Telescope (RT), XTE/ASM and GRO/BATSE respectively. We combine these data sets for the period 1996 April–May, during which a deep infrared spectrum of the source was also obtained.

2. Results

Fig 1 presents the RT, ASM and BATSE monitoring of GRS 1915+105 over the period 1996 April–May, indicating the date on which we obtained our infrared spectrum and when radio QPO were observed. Lack of space precludes a discussion; we only summarise the behaviour of the source in each energy regime.

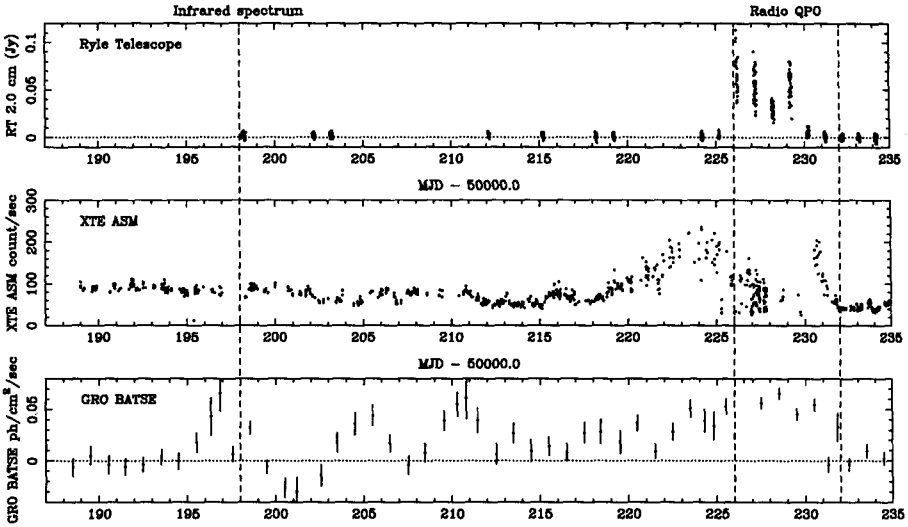

Figure 1. Radio, XTE (ASM) and GRO (BATSE) monitoring of GRS 1915+105 over the period April–May 1996, indicating when our IR spectrum was obtained and when radio QPO were observed.

- **Radio :** GRS 1915+105 remained below detection levels ($\sim$ 0.5 mJy) with the RT until May 23 when it underwent a rapid flare event. Between May 23–27 the source exhibited radio QPO with periods in range 20 – 100 min.
- **Infrared :** the UKIRT IR spectrum obtained revealed (at least) strong HeI 2.06 μm and HI 2.16 μm emission.
- **Soft X-ray :** GRS 1915+105 had been in a gradual decline until $\sim$ May 20, when it began brightening. During the period of the radio QPO many large amplitude, rapid brightness variations were observed (see also Greiner this proceedings).
- **Hard X-ray :** the hard X-ray brightness of GRS 1915+105 varied over the entire 1996 April–May period, but shows activity around the period of the radio flare, with a steady increase in flux up to $\sim$ 27 May, when the flux again declined.

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References

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Mirabel, I. F., Rodriguez, L. F. 1994, Nature, 371, 46