

## OPTICAL BRIGHTNESS MONITORING OF THE TWIN QSO Q0957+561A,B \*

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**ABSTRACT.** The gravitationally lensed QSO 0957+561A,B has been monitored from 1979 to the present with CCD cameras. We believe that the arrival time difference is  $1.2 \pm 0.2$  years.

Our program of optical brightness monitoring of the twin QSO 0957A,B (TwQSO) has been continued and results as of August 1984 have been published by Schild and Cholfin (1986), who found an arrival time difference  $\Delta t$  of 1.03 years. Observations with photometric accuracy of 1% on 30 nights from the most recent observing season have been added to the data set with the following results:

- 1.) The cross-correlation of the two light curves now has only a single peak, corresponding to  $\Delta t = 1.3 \pm 0.3$  years (Figure 1).
- 2.) The light curve for the QSO now covers a span of 6 years (Figure 2). The preceding QSO image (Component A) gradually increased in brightness by 15% from 1979.0 to 1982.0. Between 1982.0 and 1983.0 it increased by an additional 15% and then remained nearly constant until 1984.0, when it dropped by 0.1 mag. This brightening and subsequent fading provided a signature which was seen one year later in the B image.
- 3.) Observations in the Nov. 1984-May 1985 observing season on 30 nights showed brightness variations of 10%. We plan to watch for these brightness fluctuations in nightly monitoring during the coming observing season with the hope of determining  $\Delta t$  to within 1 day.
- 4.) From six nights of intensive and protracted observing with a time resolution of 10 minutes, we do not find evidence for 1% or greater brightness fluctuations on 10 minute to 4 hour time scales. We do find evidence for brightness fluctuations on a time scale of a day.

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\* Discussion on p.553

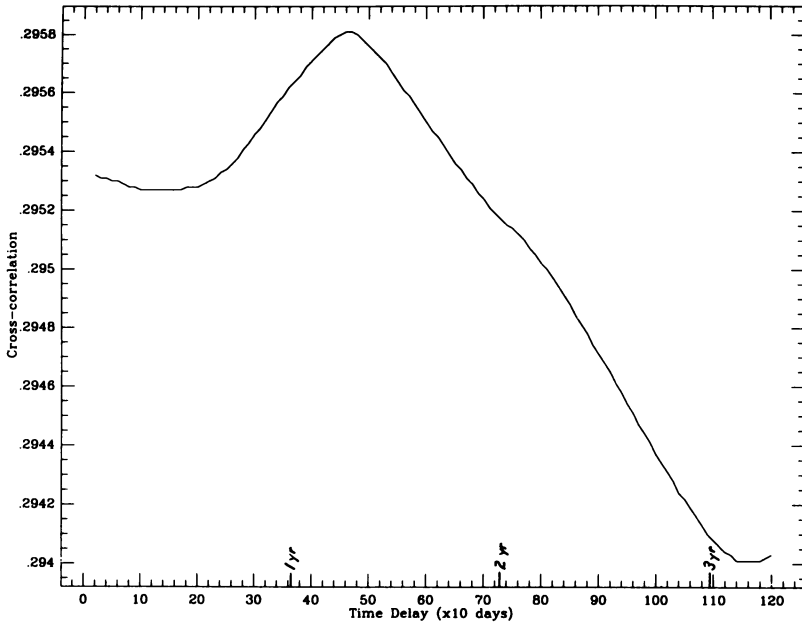


Figure 1. Cross correlation of the light curves of the two QSO images. The correlation peak corresponds to a  $\Delta t = 1.3 \pm 0.3$  years, with the northern image arriving first.

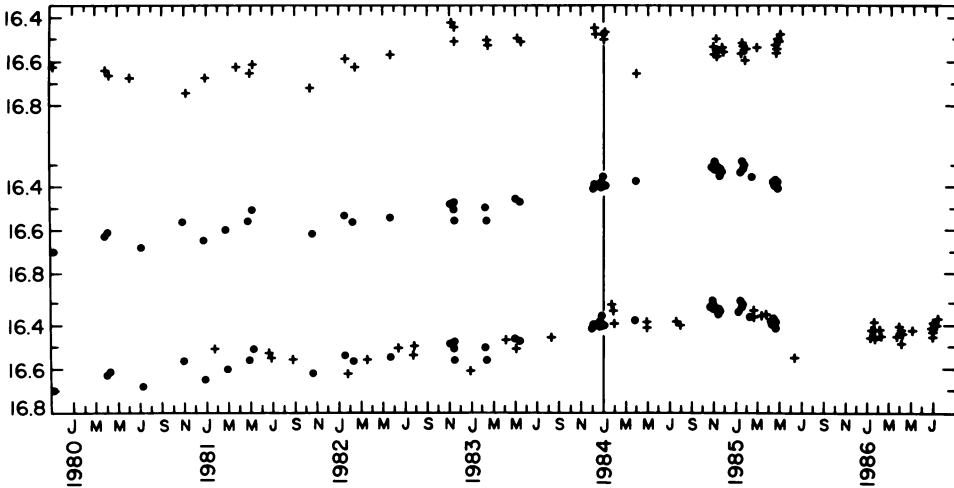


Figure 2. Light curves of the northern (upper) and southern (middle) QSO components. The lower curve shows the two components together with a shift of  $\Delta t = 1.2$  years.