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Around-the-clock observations of the Q0957+561A,B gravitationally lensed quasar. II. Results for the second observing season

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Abstract

We report on an observing campaign in 2001 March to monitor the brightness of the later arriving Q0957+561B image in order to compare with the previously published brightness observations of the (first-arriving) A image. The 12 participating observatories provided 3543 image frames, which we have analyzed for brightness fluctuations. From our classical methods for time-delay determination, we find a 417.09 ± 0.07 day time delay, which should be free of effects due to incomplete sampling. During the campaign period, the quasar brightness was relatively constant and only small fluctuations were found; we compare the structure function for the new data with structure function estimates for the 1995-1996 epoch and show that the structure function during our observing interval is unusually depressed. We also examine the data for any evidence of correlated fluctuations at zero lag. We discuss the limits of our ability to measure the cosmological time delay if the quasar's emitting surface is time resolved, as seems likely.

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Keywords

Gravitational lensing