A New Quasar Pair: Q2126-4350 and Q2126-4346

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Since the discovery in 1979 of the first gravitationally lensed quasar Q0957+561, a lot of effort has been devoted to finding more such objects. Twelve are now known, the largest separation between the various images being 6.5 arcsec.

However, neighbouring quasars having the same redshift are not necessarily images of a gravitationally lensed system. Six pairs of quasars have been found with separations in the range 3 to 10 arcsec corresponding to a few tens of kiloparsecs. These objects are believed to belong to the same group or cluster of galaxies.

Another pair of quasars, Q1146+111 B and C, at z=1.012, with a separation of 157 arcsec, attracted a lot of attention some time ago. Turner et al. (1986) have suggested that this is a single quasar gravitationally lensed by a massive cluster of galaxies. Blandford, Phinney and Narayan (1987) have shown that this assumption is very unlikely to be correct and Phinney and Blandford (1986) have suggested that Q1146+111 B and C are two distinct quasars separated by ~ 700 kpc whose proximity is attributable to clustering.

In the course of a survey for optically variable quasars (Hawkins and Véron, 1990), we have found a new pair of quasars (Q2126-4350 and Q2126-4346) with similar redshift (z~1.10) and separation (202 arcsec) to Q1146+111. These two objects have about the same magnitude (B=20.2 and 20.4 respectively on the reference UKST Schmidt plate). Both have a high amplitude of variability, AB=1.0 mag. We have determined that, in our sample, ~8 % of all UVX quasars have such a high amplitude of variability; this fact suggested to us that, in this case, we were possibly observing a large-separation gravitationally lensed system.

A 60-min exposure spectrum was obtained on August 18, 1993 with the EMMI spectrograph at the ESO NTT 3.5-m telescope (shown in Figure 2). The two objects were placed simultaneously on the slit. The stronger object (Q2126-4350) shows a broad Mg II emission line and a narrow [OII] emission line allowing to determine an accurate redshift z=1.116. The fainter object has only a broad Mg II emission line at the same redshift. The two spectra look significantly different, but if the objects are two images of a single quasar, these differences could perhaps be due to the time delay between the two light paths.

The whole 19-deg^2 field of our variable quasar search has been surveyed at 843 MHz with the Molonglo Observatory Synthesis Telescope (MOST) (Mills, 1981). One member of the new quasar pair (Q2126-4346) is a strong radio source, with a flux density of 178 mJy, whereas the other quasar (Q2126-4350) is not detected at 843 MHz, having a 3σ upper limit of 2.5 mJy. Furthermore, Q2126-4346 is not detected in the PNM survey at 4850 MHz (Gregory et al. 1993), implying that the source is weaker than 45 mJy at this frequency and therefore that it has a normal spectrum ($\alpha < -0.8$) and is unlikely to be variable. Consequently, the radio information almost certainly excludes the hypothesis that we are looking at a gravitationally lensed system and reinforces the idea that quasars cluster on a scale ~1 Mpc.

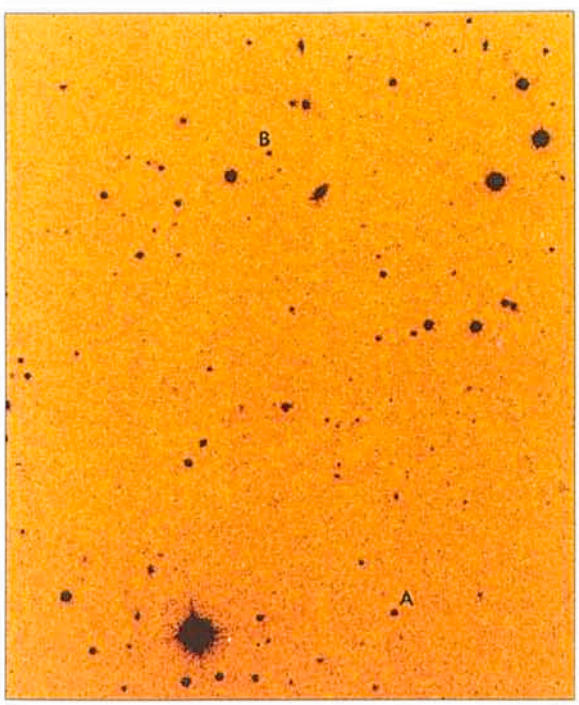

Figure 1: *Part of a 2-minute exposure frame taken on August 18, 1993 through a I filter with EMMI at the ESO NTT on La Silla. The size is 3.9 arcmin × 4.7 arcmin. North is up, east to the left. The seeing is 1.4 arcsec. The two quasars, Q2126-4350 and Q2126-4346, identified with the letters A and B, respectively, are separated by 202 arcsec.*

References

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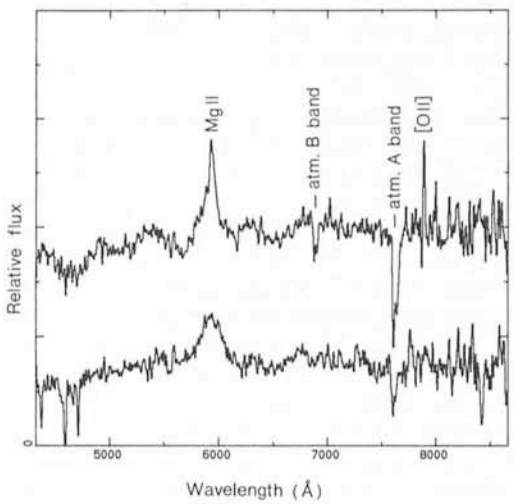

Figure 2: *Spectra of the two quasars observed with EMMI. Top: Q2126-4350, bottom: Q2126-4346.*