# MULTIFREQUENCY OBSERVATIONS OF THE BL LAC OBJECT 1219+28 +

Donna Weistrop*, David B. Shaffer+ and Paul Hintzen*
*Lab. for Astronomy and Solar Physics, Goddard Space Flight Center
+Interferometrics, Inc.

The BL Lac object 1219+28 has been observed at visible wavelengths and at 2.3 GHz, 5.0 GHz and 8.3 GHz using the VLBI network.

The visible observations include spectra and direct images obtained at Kitt Peak National Obs. with the PF/CCD camera and the cryogenic camera, respectively. A single emission line at 5521 Å has been observed in the spectrum of 1219+28. No emission lines have been detected in this object previously (Strittmatter et al. 1972). The [OIII] 5007 Å line has been observed to be one of the strongest emission lines in several BL Lac spectra ( Miller, French and Hawley 1978). If we assume this identification for the observed line, we find z = 0.103. At this redshift, the 4959 Å line is very close to a night sky line and could not be distinguished. There is a small bump where $H_\beta$ would be expected, but the feature may not be significant.

Direct imaging in a broad red passband reveals the presence of an underlying elliptical nebulosity (Figure 1). The existence and approximate orientation of the nebulosity is confirmed by a much shorter integration in V. For several BL Lac objects, similar features have proved to have the characteristics of elliptical galaxies. There are two galaxies to the SW of 1219+28 (Figure 1). The presence of the closer one has been noted previously (Strittmatter et al. 1972). A spectrum obtained for this object is extremely noisy; thus far, we have not been able to determine its redshift from the data. The separations of these objects from the BL Lac are about 10" and 21". If the galaxies are at the same redshift as 1219+28, the distances correspond to 27 kpc and 53 kpc assuming $H_o$ = 50 km $sec^{-1}$ $Mpc^{-1}$ and $q_o$ = +0.1. Hutchings and Campbell (1983) have recently suggested that many QSO's appear to be interacting with other galaxies and that such interactions may activate the QSO. The presence of a galaxy apparently close to 1219+28 is consistent with this hypothesis. No definite conclusions can be drawn until redshift data have been obtained. There are other faint galaxies in the field, and the possibility that the two near 1219+28 are at different distances along the same line-of-sight cannot be dismissed.

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Radio observations were made at 2.3, 5.0 and 8.3 GHz. At all three frequencies there is a central unresolved source with a jet at p.a. ~ 110°. The jet has three components. Two are visible in the 5 GHz map, at distances of 3.4 mas and 6.2 mas from the core source (Figure 2). A third component is visible in the 8 GHz map, only 0.74 mas from the core. The component 4.0 mas from the core in the 2.3 GHz map is probably the same as the 3.4 mas component in the 5 GHz map. The jet shows some curvature which does not increase close to the core.

There is no obvious relationship between the orientation of the radio jet and the nebulosity underlying 1219+28. The p.a. of the apparent major axis of the nebulosity is about 65°. The difference in the position angles indicates the radio jet is not being emitted along the rotation axis of the nebulosity, assuming the rotation axis defines the minor axis. However, we cannot rule out the possibility that the jet is emitted in the plane of the nebulosity.


Figure 1. Low intensity contour map of the field of 1219+28 (northernmost object). The vertical feature at the top is due to saturation in the center of the image.

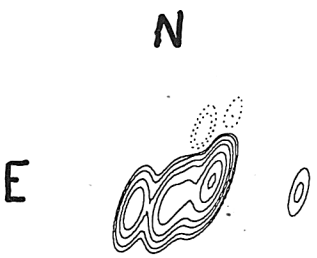


Figure 2. 5.0 GHZ map of 1219+28.

References

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