LETTER TO THE EDITOR

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"Observing Variation in Quasars"

When viewed through an optical telescope, a quasar (short for "quasi-stellar source") appears like a faint star. Quasars, believed to be the nuclei of active galaxies, are the most luminous objects known in the Universe. Quasars, BL Lacertae objects, and other active galactic nuclei (AGN's) emit electromagnetic radiation over a wide frequency range - from radio to optical to x-ray wavelengths. Previous studies have shown that this broadband emission, called synchrotron radiation, is produced by relativistic electrons moving in ordered magnetic fields. However, the relationship between the emitting regions at the different wavelengths is not completely understood.

The optical emission is time-variable, with timescales of variations ranging from hours to decades and brightness ranges - in some instances of up to 5 magnitudes (Figure 1). These variations are unpredictable, though many quasars exhibit periods of enhanced activity during which occur a series of day-to-month-long outbursts.

Preliminary AAVSO charts exist for several active galaxies and quasars, including NGC 1275 in Perseus, BW Tauri (3C 120), 0J 287 in Cancer, Markarian 421 in Ursa Major, 4C 29.25 (1156+295) in Ursa Major, 3C 273 in Virgo, NGC 4151 in Canes Venatici, NGC 5548 in Bootes, and BL Lacertae. These AGN's are regularly followed visually by several AAVSO observers (various IAU Circulars) and in photometric and photographic monitoring projects at national observatories (for example, Smith et al. 1987; Pica et al. 1988; Smith et al. 1985). In addition, several quasars - such as 3C 279 in Virgo, 3C 345 in Hercules, and 3C 454.3 in Pegasus - have recently attained brightness levels which put them within the range of moderate size amateur telescopes.

Interested observers are encouraged to obtain preliminary charts from the AAVSO and begin observing these interesting "quasi-stars", several of which historically have had variable star designations. Since the optical variations are unpredictable and can be as great as several tenths of a magnitude per day, observers should make frequent observations.

REFERENCES

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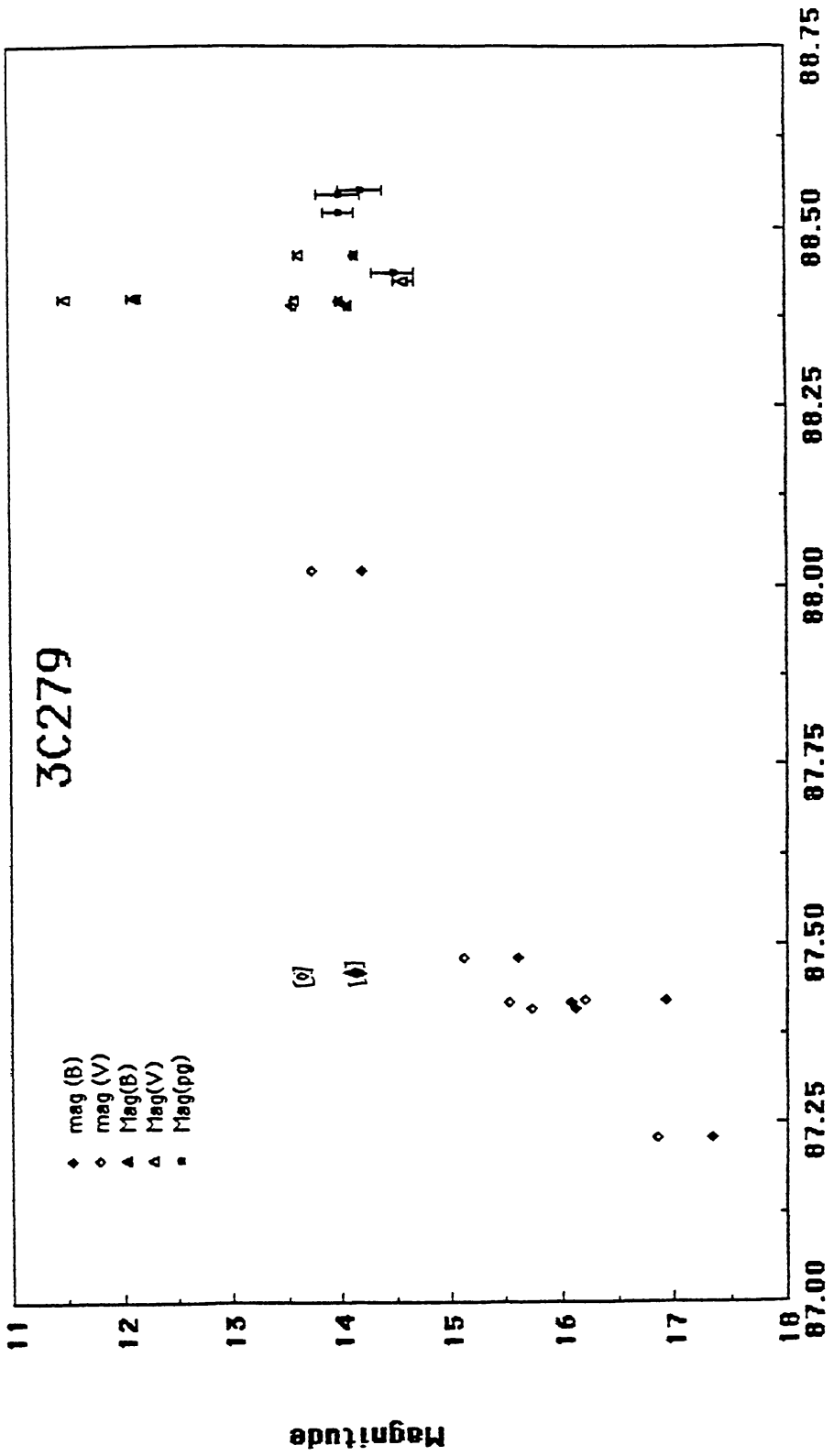

Figure 1. Observations of the variable quasar 3C 279 during 1987 and 1988. During mid-1988, rapid daily variations of 1 magnitude were observed.