

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 787

Konkoly Observatory
Budapest
1973 May 2

OPTICAL BEHAVIOUR OF FOUR QUASI-STELLAR OBJECTS

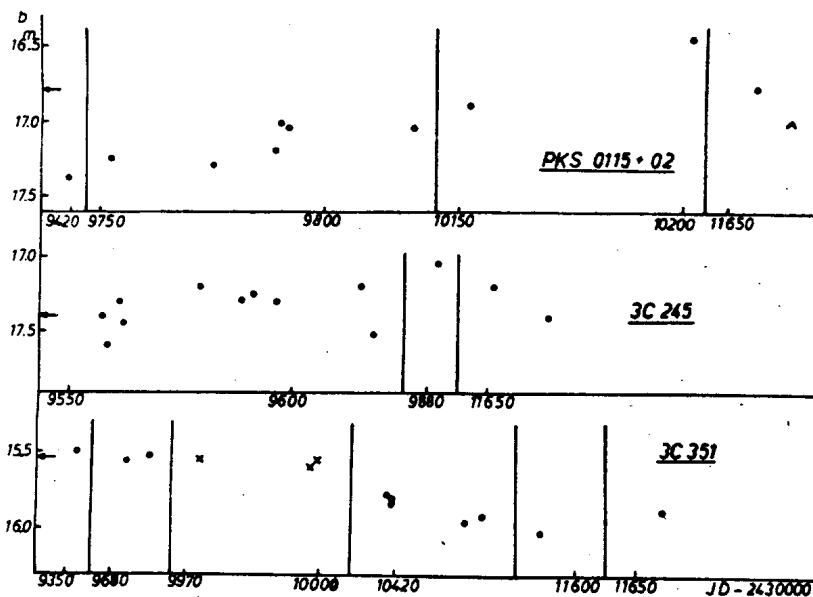
Four quasi-stellar objects are within the fields frequently observed at the 60/90 cm Schmidt telescope of Jena University Observatory in the course of the search for supernovae.

The objects are PKS 0106+01, PKS 0115+02, 3 C 245, and 3 C 351, the period covered 1966 September to 1972 November. The plates were taken in the instrumental b-colour (ORWO ZU 2 + GG 13,2 mm), which matches the B-colour of the UBV system. Photometric scales were determined from the diameters of stellar images on the prints of the Palomar Observatory Sky Survey (POSS) as was described by Dorschner et al. In the present case an individual relation between magnitude and diameter had been set up, however. These scales were supplemented by photographic transfer of a neighbouring standard field (3C245) and by a standard sequence within the field after Angione (3C351). In both cases the accordance was satisfactory. In the following the results of the long-term behaviour are summarized.

PKS 0106+01: Only seven plates are available. With one exception the magnitudes scatter around $b=17^m.6$, a figure which has been determined on the POSS (JD=243 5046.1), too. For 1967 October 28 (JD=243 9792.4) the measurement gives $b=18^m.25$. It should be noted that Bolton et al. report $B=18^m.54$ for 1965 February 14 (JD= 243 8806). The object may be variable, therefore.

PKS 0115+02: The observations give a steadily rising brightness from about $b=17^m.3$ to $16^m.6$. For there is only one plate nothing can be said on the reality of the decline shown at the end of the period. The last value (Δ in the Figure) is a lower limit. From the diameter on the POSS (JD=243 5046.1) $b=16^m.80$ results. As for the following two objects the POSS-magnitude is indicated by an arrow at the vertical scale of the Figure.

3 C 245: Over the period covered the object shows no definite light variation. A brightening indicated on 1969 January 27 (JD=243 9882.5) rests on one plate only. The magnitude determined from the POSS (JD=243 3681.2) is in accordance with the present results. Photoelectric



measurements by Ryle and Sandage show the object to be somewhat fainter ($B=17.75$ on $JD=243\ 8375$). It cannot be excluded that part of this difference comes from a systematic error in our photometric scale. The agreement with the photoelectric sequence in the case of 3 C 351 points out, however, that the systematic error should be small and the possibility of a real variation in brightness remains.

3 C 351: Up to 1967 July, including the POSS ($JD=243\ 5225.3$), the object appears to be equal magnitude (about $b=15^m.5$). In 1969 July a decrease in brightness is indicated and the last two plates give about $b=16^m.0$. The photoelectric sequence by Angione is in good agreement with the results from the POSS diameters. This author's observations (crosses in the Figure) fix 1968 June as the earliest epoch for the begin of the decline in brightness. From photographic plate collections Penston and Cannon detected an irregular variability between $JD\ 243\ 9294$ and $243\ 9771$.

When the present manuscript was finished, the publication by Lü came to the author's knowledge, showing the same optical behaviour of 3 C 351.

References:

- Angione, R.J. 1971, Astron.Journ. 76,25.
Bolton, J.G., Clarke, M.E., Sandage, A., Véron, P. 1965,
Astrophys.Journ. 142,1289.
Dorschner, J., Gürtler, J., Schielicke, R., Schmidt, K.-H.1966,
Astron.Nachr. 289, 51.
Lü, Ph.K., Astron.Journ.77, 829 (1972).
Penston, M.V., Cannon, R.D., Roy.Obs.Bull.No. 159. (1970).
Ryle, M., Sandage, A. 1964, Astrophys.Journ. 139, 419.