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VARIABLE BSS CANDIDATES IN M 3 PROVED TO BE QUASARS

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The discovery of eclipsing binaries among blue straggler stars (BSS) is important to check ideas for the origin of the BSS phenomenon (binary merging versus collisional merging, e.g. Bailyn 1995) and, moreover, for the understanding of the dynamical evolution of dense stellar systems (Hut et al. 1992). In M 3, the radial BSS distribution seems to be consistent with a collisional origin in the centre and binary origin in the outskirts (Bailyn & Pinsonneault 1995).

In the framework of a variability–proper motion survey (VPMS) for quasars in the field centred on M 3 (Scholz et al. 1997), we detected three significantly variable star-like objects in the cluster halo region having typical BBS colours and magnitudes. Figure 1 shows the colour–magnitude diagram (CMD) for all star-like objects with a high cluster membership probability which have: (1) cluster-centric distances $5' \leq r \leq 24'$ (the innermost region is excluded to minimize effects of image crowding), (2) no nearby neighbour within a $7''$ distance, (3) proper motion vectors close to the centroid of M 3 (defined by stars selected by the first two constraints and having colour indices compatible with the cluster CMD), i.e. $|\vec{\mu} - \vec{\mu}_{\rm M3}| \leq 6$ mas yr^{-1}. Photometric and astrometric data were derived from Tautenburg Schmidt plates digitized by means of the APM facility, Cambridge. Johnson B magnitudes were measured on 57 plates, taken in the years 1964 to 1994. A further 6 V plates were used to obtain $B-V$ colour indices. Proper motions were derived from 81 plates altogether with a baseline of three decades. Variability was quantified by means of a simple yet powerful variability index $I_{\rm var}$ (for details, see Scholz et al. 1997). The three BSS candidates marked in Fig. 1 and listed in Table 1 proved to be variable on a significance level larger than 99.99%.

Follow-up low-resolution spectroscopy with CAFOS at the 2.2-m telescope of the German–Spanish Astronomical Centre on Calar Alto surprisingly revealed that all three variable BSS candidates are quasars with redshifts $z \approx 1$–1.5 (Table 1). Their absolute proper motions are consistent with both the cluster proper motion and the zero-proper motion constraint for quasars due to the small absolute proper motion of M 3. Of course, [HB93] 1340+287 was catalogued as a quasar long before (Hewitt & Burbidge 1989); our observations have just confirmed the earlier redshift measurement.

We conclude that samples of *variable* BSS candidates in the outer regions of high-latitude globular clusters can be substantially contaminated by low-redshift quasars.

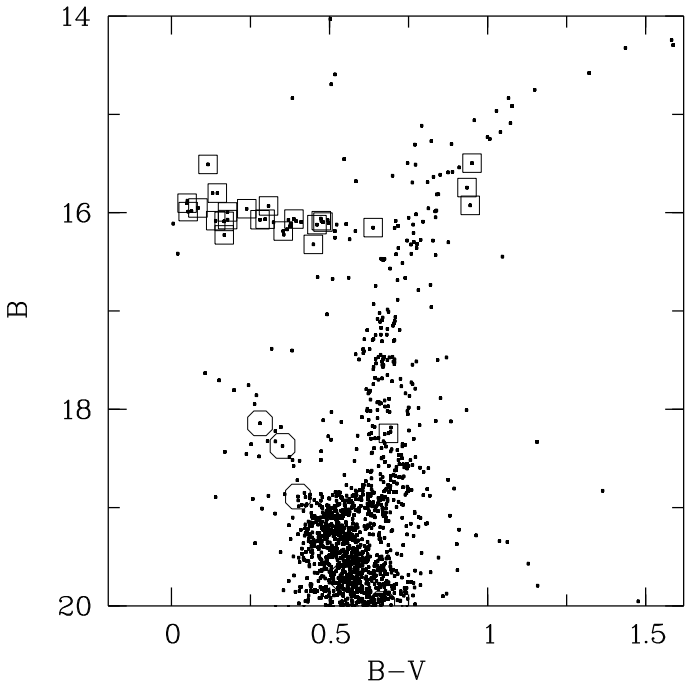

Figure 1. Colour–magnitude diagram of M3. Strongly variable BSS candidates are marked by octagons, other strongly variable stars detected by the VPMS are indicated by open squares

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Table 1: Basic data for three variable BSS candidates in M 3

VPMS #	12 006	12 465	15 224
R.A. (J2000.0)	$13^{\rm h}41^{\rm m}07\overset{\rm s}{.}5$	$13^{\rm h}42^{\rm m}30\overset{\rm s}{.}9$	$13^{\rm h}42^{\rm m}54\overset{\rm s}{.}5$
DEC (J2000.0)	$+28°39'36''$	$+28°37'25''$	$+28°28'06''$
B	18.9	18.1	18.4
$B-V$	0.40	0.28	0.35
$I_{\rm var}$	2.8	3.4	2.3
SIMBAD identifiers	NSV 6388	RX J1342.5+2837	[HB93] 1340+287
spectroscopic identification	QSO ($z = 1.580$)	QSO ($z = 1.272$)	QSO ($z = 1.037$)