SHAHBAZIAN 123: A NEW DISTANT COMPACT GROUP OF COMPACT GALAXIES*

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ABSTRACT

Image-tube scanner spectrograms were taken of seven objects in two Shahbazian compact groups of compact galaxies. The three brightest objects in Shahbazian 78 are all late-type stars. On the other hand, three of the brightest objects in Shahbazian 123 are luminous compact galaxies with $z = 0.115$, while a fourth is likely also to be a galaxy in the group.

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After Robinson and Wampler (1973) showed that the cluster Shahbazian 1 is a distant compact cluster of compact galaxies, a search for additional groups of compact galaxies was begun at the Byurakan Astrophysical Observatory. Shahbazian and others (Shahbazian 1973; Shahbazian and Petrosian 1974; Baier et al. 1974; Petrosian 1974), using Palomar Sky Atlas prints, and also direct photographs obtained with the 40-inch (1 m) Schmidt telescope of Byurakan Astrophysical Observatory, found more than 175 groups of compact galaxies. A search for additional groups of compact galaxies was begun at the Byurakan Astrophysical Observatory, found more than 175 groups of compact galaxies. However, the identification of objects 1, 2, and 3 as stars makes it clear that the group as a whole does not constitute a group of compact galaxies.

The spectra of objects 1, 4, and 5 in Shahbazian 123 resemble those of E-type galaxies and are generally similar to the spectra obtained for the galaxies in Shahbazian 1 by Robinson and Wampler (1973). The spectral features most clearly identified were the characteristic sharp break in the continuum slope just longward of H and K of Ca II and the G-band. The K line itself was located near the night-sky Hg I 4358 line, and the spectra were too noisy in this region to permit reliable measurement of this feature and the nearby H line, but it was possible to measure with confidence the break in the continuum slope just longward of these lines and the G-band. The rest wavelength adopted for the break was 4002 Å and for the G-band 4305 Å after Miller, Robinson, and Wampler (1973). None of these galaxies showed emission lines in their spectra. Independent spectra of each object were obtained through each of the two entrance apertures of the spectrograph alternately and were measured and reduced separately.
agreement to within 0.001 in \( z \) measured for the three objects is fortuitous. Table 1 also contains an estimate of the magnitudes of the galaxies at \( \lambda 5480 \) determined by comparison observations of standard stars. Since each of the galaxies appeared larger than the entrance aperture used, 2'9 by 4'0, these magnitudes are definitely upper limits, and it is possible that the total magnitudes could be as much as 1 mag brighter. Adopting the magnitudes listed in table 1 and a Hubble constant of 55 km s\(^{-1}\) Mpc\(^{-1}\) gives absolute magnitudes of \(-20.0\), \(-20.2\), and \(-19.9\) for objects 1, 4, and 5, respectively. Since the brightnesses are lower limits, it is evident that these galaxies are very luminous. Object 2 in Shahbazian 123 was not observed long enough to provide a spectrum of quality sufficient to provide a reliable redshift, but the spectrum obtained shows a continuum break near 4450 Å as in objects 1, 4, and 5, and it is likely that this object is also a galaxy in the group. The angular size of the group is approximately 2'.

The above considerations suggest that the Shahbazian groups are likely to be a mixture of genuine groups of compact galaxies similar to Shahbazian 1 and 123 and chance groupings of stars and galaxies. The similarity between Shahbazian 1 and 123 is evident, as they are both compact groups containing luminous compact galaxies, though additional observations of Shahbazian 123 are required in order to determine if the velocity dispersion in this group is as low as that reported for Shahbazian 1. It does not appear that Shahbazian 1 is a unique cluster, as Arp, Burbidge, and Jones (1973) have supposed. Additional observations of a sample of other groups in the Shahbazian lists are desirable in order to ascertain what fraction of the groups are actually similar to the very interesting groups 1 and 123.

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REFERENCES