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R.F. Green, E.Ye. Khachikian, D.B. Sanders

Byurakan Surveys: Density of Bright AGN

L.K. Erastova

Byurakan Astrophysical Observatory, Armenia, 378433

It is clear now that morphological criteria don't divide galaxies from QSOs. Many galaxies are stellar-like objects and, conversely, quasars have host galaxies of various luminosities. For instance, two objects - SBS 1120+586A and SBS 1123+598 - absolutely do not differ from stars on the charts of the POSS and were classified as BSO-type. But they turned out to be galaxies with moderate luminosities (Markarian et al. 1988). Erastova (2000) produced a list of stellar-like galaxies from the SBS. Out of 339 KUV objects, 107 (31.6%) are emission-line galaxies of various luminosities (Darling & Wegner 1996). A considerable number of active galaxies appear among CSO - Case stellar objects. Conversely, objects having extended images on low-dispersion spectral plates turned out to be QSOs. SBS 1520+530 is a gravitationally lensed QSO with z=1.855 and on our low-dispersion plates appears as a galaxy (Chavushyan et al., 1997).

It is claimed that the surface density of bright quasars from the Bright Quasar Survey (BQS - Schmidt & Green (1983)) is considerably low and that it departs from the relation of lg(N<B)-B established from fainter magnitudes (see Wampler & Ponz 1985, Markarian et al. 1987, Goldschmidt et al. 1992). There are many different reasons proposed (Köhler et al. 1997). We consider that these reasons are not enough. The general reason for the discrepancy is probably that QSO surveys include in their samples QSOs and Sy1-type galaxies in arbitrary proportion. On the other hand, we have another survey - the Markarian survey of UV-continuum galaxies, which covers the same interval of magnitudes. Some fraction of the Sy1-type Markarian galaxies are also in the BQS survey. It's clear, because both Markarian and Green used the same criterion, UV-excess, for discovering active objects. We decided to combine the Sy1 galaxies and QSOs from the Markarian sample with the QSOs from the BQS survey and create a new composite AGN sample for investigation of their surface density. We claim that we have one population of AGN found in these two surveys: Markarian Sy1's and QSOs from the BQS. We have taken the area of the composite sample to be 10714 sq. deg. We have chosen from Markarian et al. (1989) the Sy1-type galaxies and QSOs and added all QSOs from the BQS sample. So, a new sample of 101 AGN was created with a limiting magnitude $\sim 15\overset{m}{.}5$, which we used for constructing the lg(N<B)-B relation. Now it's easy to derive the lgN(<B)-B relation and determine the surface density of active extragalactic objects - QSOs and Sy1-type galaxies. This important diagnostic relation between blue magnitude and number of objects per sq. deg. is shown in Figure 1.

It may be approximated by the linear regression lgN=βB+const, where β=0.60 $\pm$0.06 in the range of magnitudes $B = 12\overset{m}{.}5 - 15\overset{m}{.}5$. The same relation was fit for the HES Survey from Köhler et al. (1997). In both cases the magnitudes were not corrected for extinction in our Galaxy or for the contribution of the host galaxy to the total brightness of the active galaxy. It

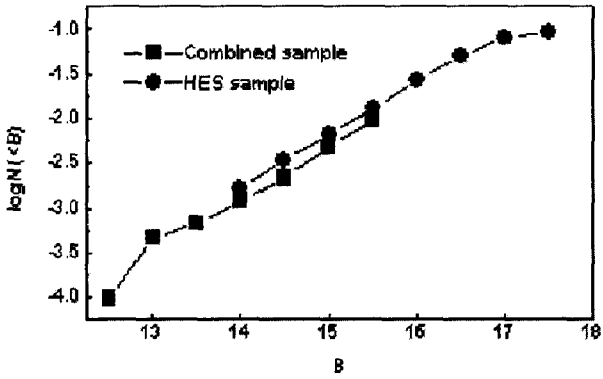

Figure 1. Squares represent lgN(<B)-B for the combined sample for $13^m.5$-$15^m.5$ magnitude; dots show the same dependence for the HES survey . These two curves join smoothly without gaps between them.

matches well our relation with a slope of β=0.59±0.04 for the range of magnitudes $B = 14^m.0 - 17^m.5$. The surface density is 0.01±0.01 per sq. degree for objects up to $B = 15^m.5$ with redshifts less than z=2.0. We propose that this newly created combined sample of local objects may serve to determine the zero-point of surface and space densities as well as other properties of active extragalactic objects. Now we have a flux-limited and well-defined sample of AGN (QSOs and Syl-type objects). One of the first experiments to join samples of Sy-type galaxies and QSOs was made by Stepanian et al. (1989) from the SBS objects.

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