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A MULTIWAVELENGTH STUDY OF NLS1 GALAXIES FROM THE SECOND BYURAKAN SURVEY

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In this work we present some results of the multiwavelength study performed to a sample of 26 NLS1s discovered in the Second Byurakan Survey (SBS NLS1s). One of our main findings is that almost all SBS NLS1s may not have the FIR bump. Their SED suggest that they may also possess the BBB. In contrast with previous works, we have found weak soft X-ray NLS1s, radio loud NLS1s, weak FeII emission NLS1s, as well as objects with FWHM of H_β less than 2000 $km\ s^{-1}$, but with $[OIII]/H_\beta > 3$. These results suggest that the NLS1s definition is very smooth and artificial.

In 1985 Narrow Line Seyfert 1 (henceforth NLS1s) were a relatively rare and peculiar subclass of Seyfert (Sy) galaxies. NLS1s are defined as those AGN which have a $FWHM(H_\beta) < 2000\ km\ s^{-1}$ and $[OIII]/H_\beta < 3$. The formal spectral classification criteria for NLS1s galaxies are based on (a) the presence of narrow permitted lines only slightly broader than the forbidden ones; (b) the ratio $[OIII]/H_\beta < 3$, but exceptions are allowed if there are also strong $[FeVII]$ and $[FeX]$ emission lines, unlike what is seen in Seyfert 2 galaxies; and (c) $FWHM(H_\beta) < 2000\ km\ s^{-1}$. The first two criteria are from Osterbrock & Pogge's (1985) original classification, while the maximum line-width criterion was introduced by Goodrich (1989).

The SBS NLS1s sample consist of 26 objects, which have $M(B) > -23.0$ and a redshift range $0.0243 < z < 0.317$. In order to obtain the multifrequency data for the SBS NLS1s we have identified the objects as ROSAT, IRAS or Radio sources taking into account the distance of their optical positions with respect to the positions found in the other surveys. Except for 4 objects, all SBS NLS1s were identified as 1RXSJ sources, some of them for the first time (e.g. Voges et al. 1999). Four SBS NLS1s were identified as RASS faint sources. Only one object was identified as an IRAS source and nine as radio sources, eight of them are FIRST sources and one was identified as an NVSS source.

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Our study shows that they are strong or moderately strong ($L_x = 42.8 - 45.4$) soft X ray sources. Four objects which were not detected in the soft X ray bands are optically luminous sources ($logL_B > 44.2$). SBS NLS1s which are luminous in the soft X-ray bands tend not to be luminous in the infrared, i.e. 92% were not detected by IRAS and they are not luminous or ultraluminous galaxies. All SBS NLS1s are radio quiet objects and 52% of them are moderately strong FeII emitters ($FeII/H_\beta > 1$). We have found a linear correlation between X-ray and optical luminosities: $logL_X = 1.34(\pm 3)logL_B - 15.3(\pm 3.7)$. The comparison of the luminosities in the FIR, optical and soft X ray continuum bands lead us to the conclusion that the SED of the SBS NLS1s may differ from those studied before. The absence of the IR bump and the weakness of the X-ray emission in some of them, if they are intrinsic properties, could be an argument against the presence of BLR in these sources.

We have also investigated the correlation between f_x/f_{opt} and the optical absolute magnitude for the sample of SBS NLS1s. No correlation was found between the ratio $logf_x/f_{opt}$ and M_B ($\alpha = 0.1$, $r = 0.07$) in the luminosity range of $19 < M(B) < -23$, in agreement with Boller et al. (1992). This result suggests no luminosity evolution at low redshift in the range $-23 < M(B) < -19$. This last result has a direct impact in the LL-AGN evolution, in the prediction of the X-ray quasar counts, by means of the ratio L_x/L_{opt}, and in the estimation of the X-ray background.

Finally, we find that there is a continuation of all properties between the SBS NLS1s and objects with $M(B) > -23.0$, i.e. NLQSOs, which are the bright cousins of the NLS1s.

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