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Optical spectroscopy of 5 Swift/BAT AGN candidates.

ATel #1985; [S. Ciroi, F. Di Mille \(Dept. of Astronomy, Padova University\), M. Zaccaria, L. Vicariotto, C. Pellegrini \(Liceo Fogazzaro, Vicenza\), M. Zorzan, A. Pegoraro \(Liceo Quadri, Vicenza\)](#)

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Subjects: Optical, X-ray, AGN

We report the spectroscopic follow-up of 5 Swift/BAT AGN candidates, published in ATEL #1794 taken in the framework of the Educational Project of the Astronomy Department "The Sky as Laboratory" (for details, see http://www.astro.unipd.it/inglese/projects/progetti_en.html). Optical spectra were obtained in February 2009 at the 1.2 m Galileo telescope of the Asiago Astrophysical Observatory (Italy) equipped with a Boller & Chivens spectrograph. A grating of 300 mm⁻¹ gave spectra in the range 3400-8000 Å with a resolution of about 10 Å. Spectra were reduced and analyzed with IRAF. The host galaxy spectrum was fitted with STARLIGHT synthesis code (Cid-Fernandez et al. 2005, MNRAS,358,363) and then subtracted.

2MASX J02485937+2630391 Seyfert 2 z = 0.0583 Texp = 1800 sec 2009

Its spectrum shows the typical optical emission lines of Seyfert galaxies, from [O II]3727 up to [S II]6716,6731. The H-alpha/H-beta ratio is ~ 11, even after underlying stellar component subtraction, and indicates an extinction A(V)~ 4. Ionization degree is high, as shown by [O III]5007/H-beta ~ 7.6. The average FWHM of emission lines, after instrumental correction, is about 550 km sec⁻¹. STARLIGHT analysis reveals the presence of a 2.5 Gyr stellar population contributing significantly (25%) to the host galaxy light.

2MASX J05442257+5907361 Seyfert 2 z = 0.0674 Texp = 3600 sec 2009

This is the typical spectrum of a Seyfert 2 galaxy. Already present in Tueller et al. 2009 (astro-ph/0903.3037), we confirm their classification (Seyfert 1.9) and redshift (0.066). H-alpha/H-beta = 7.2 corresponds to A(V)=2.7, [O III]5007/H-beta = 14.1 . The average FWHM of emission lines is about 400 km sec⁻¹.

2MASX J14391186+1415215 z = 0.0708 Texp = 2400 sec 2009 Feb 19.12

It is an absorption line galaxy dominated by old stellar population, but showing a weak H-alpha emission with observed flux 3.9*10⁻¹⁵ erg cm⁻² sec⁻¹. Redshift has been determined by using the IRAF task FXCOR based on the Tonry & Davis method (1979, AJ 84,1511). We confirm that this source is a member of a group of galaxies having similar magnitude (g ~ 17) :

2MASX J14391750+1416175	z = 0.070	no emission
2MASX J14391510+1416205	z = 0.070	no emission
2MASX J14391083+1417245	z = 0.069	no emission
2MASX J14392129+1415115	z = 0.067	emission lines

2MASX J14530794+2554327 z = 0.0487 Texp = 2400 sec 2009 Feb 19.16

This source is clearly a QSO. It shows broad Balmer emission lines, H-alpha and H-beta having

FWHM $\sim 9\,000\text{ km sec}^{-1}$, but also narrow [O III]5007 having FWHM $\sim 850\text{ km sec}^{-1}$. The luminosity of the continuum at rest-frame 5100 \AA is about $2.7 \times 10^{43}\text{ erg sec}^{-1}$.

NGC 4686 $z = 0.017$ $T_{\text{exp}} = 1200\text{ sec}$ 2009 Feb 19.09

The observed spectrum of NGC 4686 shows [N II]6583 emission line, while H-alpha emission is clearly embedded in the underlying absorption and [O III] is faint. After stellar continuum subtraction, H-alpha and [O III]5007 are measurable: [N II]/H-alpha ~ 2 and [O III]/H-alpha (not internal reddening corrected) ~ 1.3 , while H-beta is not detectable. This galaxy can be classified as a LINER.

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