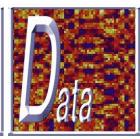




ASTROPHYSICS SEMINAR









Friday, 24 March 2006 at 11:00

The Hard X-ray 20–40 keV AGN Luminosity Function

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Abstract. We present the first luminosity function of active galactic nuclei (AGN) in the 20-40 keV energy range, based on 70 extragalactic objects detected by the imager IBIS/ISGRI on-board INTEGRAL. It was obtained by compiling a complete, significance limited sample based on 25,000 square degrees to a limiting flux of 3 10^{-11} ergs/cm²/sec (7,000 square degrees to a flux limit of 10^{-11} ergs/cm²/sec) in the 20–40 keV band with INTEGRAL. We have constructed a detailed exposure map to compensate for effects of non-uniform exposure. The flux-number relation is best described by a power-law with a slope of 1.66 ± 0.11 . Integration of the cumulative flux per unit area leads to $f_x = 2.6 \ 10^{-10}$ ergs/cm²/sec, which is about 1 % of the known 20–40 keV X-ray background.

The AGN luminosity function shows a smoothly connected two power-law form, with an index of $\Gamma_1=0.9$ below, and $\Gamma_2=2.2$ above the turn-over luminosity of $L_x=4.6\ 10^{43}$ ergs/sec. The emissivity of all INTEGRAL AGNs per unit volume is W(> 10^{41} ergs/sec) = $2.8\ 10^{38}$ ergs/sec/Mpc³. These results are consistent with those derived in the 2–20 keV energy band and do not show a significant contribution by Compton-thick objects. Because the sample used in this study is truly local (z = 0.022), only limited conclusions can be drawn for the evolution of AGNs in this energy band. But the objects explaining the peak in the cosmic X-ray background are likely to be either low luminosity AGN ($L_x < 10^{41}$ ergs/sec) or of other type, such as intermediate mass black holes, clusters, and star forming regions.

Additional Information

The seminars are given in the ISDC "Pavillon" building Address: INTEGRAL Science Data Centre, ch. d'Écogia 16, CH-1290 Versoix WWW: ISDC Seminars: http://isdc.unige.ch/?Science+seminars