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Title: A catalogue of ultraluminous X-ray sources in external galaxies

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Description of the table and its columns:

In Table 1 the galaxies are ordered according to right ascension. Part of the (mainly numerical) information on ULXs and their host galaxies is arranged in nine columns, below which for each galaxy additional information is provided in the form of key words with references. The information on the host galaxies is given in the first line, and the X-ray information on the ULXs is given in the following lines, one line for each ULX. The columns have been arranged as follows.

In Line 1 the first column contains the galaxy name. Alternative galaxy names are given in the second column. The third column in Line 1 lists the morphological type of the galaxy, taken from *the Third Reference Catalogue of Bright Galaxies* ($RC3$; de Vaucouleurs et al. 1991). The fourth column is the mean numerical index of stage along the Hubble sequence (T) of the galaxy, which is also taken from $RC3$, where -5 is Elliptical, 0 is S0a and 10 is Irregular. The fifth column is the distance of the galaxy in Mpc. The distance is extracted from the *Nearby Galaxies Catalog* by Tully (1988) if the recessional velocity (cz) listed in $RC3$ is smaller than 1000 km s^{-1}, otherwise it was computed from the recessional velocity using $H_0 = 75$ km s^{-1} Mpc^{-1}. The sixth column is the Galactic hydrogen column N_H in 10^{20} cm^{-2} units taken from Dickey & Lockman (1990). In the last three columns of the first line, the B-band photographic magnitude (M_B), the near infrared magnitude (M_{K_s}), and the far infrared magnitude (M_{FIR}) are listed. The B-band photographic magnitude is taken from $RC3$; the near-infrared K_s-band magnitude is calculated from the 20 mag arcsec^{-2} isophotal magnitude listed in the *2MASS Large Galaxy Atlas* (Jarrett et al. 2003); the far-infrared magnitude is calculated from $M_{FIR} = -20.0 - 2.5\ log\ FIR$, where FIR is the far infrared continuum flux measured at 60 and 100 microns as listed in the *IRAS Point Source Catalog* (1987).

In the following lines the first column contains the ULX names we have designated, ULX1, ULX2, and so on. Alternative ULX names that had been used previously are given in the second column. The third and fourth columns in the lines contain the right ascension (RA) and declination (DEC) of the ULXs for the epoch 2000. In Columns 5 and 6, the peak X-ray luminosities, in units of 10^{39} ergs s^{-1}, and the energy range in keV are given. Column 7 is the nuclear offset, i.e. radius from nucleus in arcseconds, assuming that the galaxy center is at the $RC3$ optical position.

Only strong X-ray sources with enough counts have X-ray spectral fits. In Column 8 we give the best fit model of recent X-ray observation of ULXs, and the fit results are given in Column 9, with the spectral index listed for a power-law fit and the inner temperature in keV for a thermal model fit. If a two-component fit is needed, we use the symbol '+' between the two fit models and fit results for the two-component best fit. The following abbreviations have been used for the fit model:

- PL: power-law model;
- BB: blackbody;
- MCD: multicolor disk (Mitsuda et al. 1984);
- MKL: MEKAL;
- BR: bremsstrahlung;
- RS: Raymond-Smith thermal model (Raymond & Smith 1977).

Table 1. Ultraluminous X-ray sources

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 247		SAB(s)d	+7.0	3.69	1.37	9.66	8.18	10.55
ULX1	NGC 247 X1	00 47 03.9	-20 47 43.4	1.2	0.1-2.4	142.8	BR	0.12

Original source name from Lira, Lawrence & Johnson (2000, hereafter LLJ00); at the edge of of a bright star-formation region; no obvious optical counterpart; very soft spectrum and variable, thus an accreting black hole candidate (BHC). Also see Read, Ponman & Strickland (1997, hereafter RPS97).

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 253		SAB(s)c	+5.0	3.1	1.3	7.72	3.82	5.63
ULX1	PSX-1	00 47 34.0	25 16 37	1.2	0.3-7	44	MCD	1.3
ULX2	PSX-2	00 47 33.0	25 17 49	1.21	0.3-7	31	MKL+PL	0.61+1.7
ULX3	PSX-3	00 47 33.4	25 17 22	1.1	0.3-7	6	PL	2.1

Starburst galaxy. Chandra observation and original source names from Humphrey et al. (2003). Also see RPS97 and Strickland et al. (2000).

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 598	M33	SA(s)cd	+6.0	0.795	5.58	6.21	4.49	6.32
ULX1	M33 X-8	01 33 50.89	30 39 37.2	1.7	0.5-10	2.6	MCD+PL	1.16+2.5

Soft spectrum, not related to the 2MASS source (Foschini et al. 2004); N_H=18 (in 10^{20} cm^{-2} units) from X-ray fit (Foschini et al. 2004); a modulation of ~20% with a period of 106 days? (Dubus et al 1997); associated with a radio source (Dubus & Rutledge 2002). See also La Parola et al. (2003) and CM99.

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 628	M74	SA(s)c	+5.0	7.3	5.0	10.01	7.19	9.56
ULX1	M74 X-1	01 36 51.1	+15 45 47	10	0.3-8	159	PL	2.46
ULX2		01 36 36.5	+15 50 36	1.6	0.3-8	240	PL	1.91

A face-on spiral with distance from VLA (Smartt et al. 2002). ULX-1: neither a radio nor optical counterpart, but near several prominent OB associations, suggesting that it may be associated with recent star formation; a persistent ULX detected in both Chandra and both XMM observation; extremely variable in luminosity by more than an order of magnitude (from 5×10^{38} in 2001-2002 to 1 $\times10^{40}$ ergs s^{-1}) in only 30 minutes, and flares on a characteristic timescale of around 4000 s (Krauss et al. 2003). See Soria et al. (2004). ULX2: undetectable in both 2001 Chandra observations; detected only in 2002 Feb. as an off-center transient ULX (Soria & Kong 2002) but not in Jan. 2003, so at least 30 times fainter than 11 months before (Soria et al. 2004).

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 720		E0	-5.0	25.7	1.6	11.09	7.4	—
ULX1	source 5	01 53 00.84	-13 44 06.8	1.13	0.3-10	12.8		
ULX2	source 9	01 52 59.41	-13 43 56.9	1.96	0.3-10	26		
ULX3	source 22	01 52 56.45	-13 43 47.7	2.08	0.3-10	66		
ULX4	source 23	01 52 56.03	-13 44 39.3	1.18	0.3-10	68		
ULX5	source 27	01 52 55.78	-13 43 50.8	1.13	0.3-10	73		
ULX6	source 29	01 53 01.98	-13 42 49.9	1.91	0.3-10	91		
ULX7	source 35	01 53 06.75	-13 45 34.7	1.76	0.3-10	119		
ULX8	source 36	01 53 06.44	-13 45 40.9	1.45	0.3-10	120		
ULX9	source 40	01 53 01.77	-13 46 30.7	5.94	0.3-10	134		
ULX10	IXO 1	01 52 49.7	-13 42 11	1.26	2-10	161		
ULX11	IXO 2	01 53 02.9	-13 46 53	5.01	2-10	156		

Elliptical galaxy; accepted Hubble constant 68 km/s/Mpc; 42 X-ray Chandra point sources and X-ray luminosity using the best-fit power-law with α = 1.5 (Jeltema et al. 2003); 2-10 keV X-ray luminosity of ULXs 10 and 11, calculated from the ROSAT HRI count rate assuming a power-law spectrum with Γ = 1.7 and the Galactic hydrogen column (CP02); faint optical counterparts in the DSS images to ULXs 10 and 11 (CP02); ULXs 2, 3 and 9 coincident with GC (Jeltema et al. 2003). See also Fabbiano, Kim, & Trinchieri (1992, hereafter FKT92).

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 891		SA(s)b	+3.0	9.60	6.8	10.84	5.99	8.36
ULX1	NGC 891 X-4	02 22 31.6	+42 20 19	1.32	0.1-2.4	43.6	PL	2.78
ULX2	NGC 891 X-5	02 22 45.8	+42 25 55	1.58	2-10	327.7		

ROSAT PSPC obs. of ULX1 (RPS97). ULX2: also known as IXO 3, at the outer edge of the disk (CP02); 50% variability between two separate ROSAT HRI observations; detected with ASCA (cf. Ueda et al. 2001) but was not detected with the ROSAT PSPC (RPS97); X-ray luminosity of ULX2, calculated from the ROSAT HRI count rate assuming a power-law spectrum with Γ = 1.7 and the Galactic hydrogen column (CP02). See also RW00.

Host Galaxy Source Name	Other names Other names	Hubble-type R.A.	T-type DEC.	Dist. Lx	N_H Range	M_B Offset	M_{K_s} Best-fit	M_{FIR} Fit result
• NGC 1042		SAB(rs)cd	+6.0	18.31	3.2	11.8	9.45	12.29