

X-ray Assignment Solution (lecture 2)

- Look up the ROSAT all-sky survey count rate of the cataclysmic variable star SU UMa
- Assuming optically-thin thermal plasma emission with $kT=6$ keV and interstellar absorption of $N_H=10^{20}\text{cm}^{-2}$, estimate the 2-10 keV energy flux of SU UMa
- Further calculate the XMM-Newton RGS count rate, and determine how long an observation is required to accumulate 20,000 RGS counts
- Find out when such an observation could be made during 2014

- ROSAT all-sky survey count rate from HEASARC browse

Search was based on:

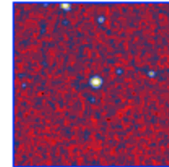
Object/Coordinates:
 resolved by SIMBAD (local cache) to [08 12 28.26, +62 36 22.5]

Coord. System: Equatorial, equinox 2000

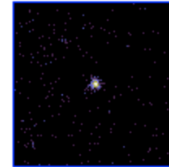
Maximum Rows:

Search Radius: arc minutes

Images generated by [SkyView](#)
 Click on image to see full *SkyView* image



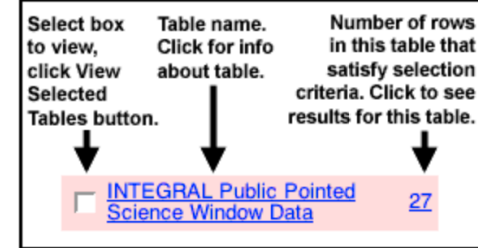
[DSS](#) Optical image, 2.83'



[RASS](#) X-ray image, 75.0'

Images centered on requested position

How to use the information on this page



Active HEASARC Missions			
<input type="checkbox"/> ASCA	<input type="checkbox"/> ASCA Proposals 2	<input type="checkbox"/> ASCA Master Catalog 2	<input type="checkbox"/> ASCA GIS Source Catalog (AMSS-I + AMSS-II) 1
<input type="checkbox"/> CHANDRA	<input type="checkbox"/> Chandra Observations 2		
<input type="checkbox"/> FERMI	<input type="checkbox"/> Fermi GBM Trigger Catalog 1		
<input type="checkbox"/> GALEX	<input type="checkbox"/> Galaxy Evolution Explorer (GALEX) Observation Log 3		
<input type="checkbox"/> HETE-2	<input type="checkbox"/> HETE-2 Timeline 1084		
<input type="checkbox"/> INTEGRAL	<input type="checkbox"/> INTEGRAL Science Window Data 1036	<input type="checkbox"/> INTEGRAL Public Data Results Catalog 14	<input type="checkbox"/> INTEGRAL Public Pointed Science Window Data 413
<input type="checkbox"/> RXTE	<input type="checkbox"/> XTE Master Catalog 194	<input type="checkbox"/> XTE Target Index Catalog 2	<input type="checkbox"/> XTE Proposal Info & Abstracts 2
	<input type="checkbox"/> XTE Archived Public Slew Data 347	<input type="checkbox"/> XTE Mission-Long Source Catalog 1	<input type="checkbox"/> XTE All-Sky Slew Survey Catalog 1
<input type="checkbox"/> XMM-NEWTON	<input type="checkbox"/> XMM-Newton OM Objects 5	<input type="checkbox"/> XMM-Newton Accepted Targets 1	<input type="checkbox"/> XMM-Newton XAssist Source List 3
	<input type="checkbox"/> XMM-Newton Master Log & Public Archive 1	<input type="checkbox"/> XMM-Newton Slew Survey Full Source Catalog, v1.5 1	<input type="checkbox"/> XMM-Newton Slew Survey Clean Source Catalog, v1.5 1
	<input type="checkbox"/> XMM-Newton Serendipitous Source Catalog (3XMM DR4 Version) 3	<input type="checkbox"/> XMM-Newton Optical Monitor Serendipitous UV Source Survey Catalog 3	
Other Missions			
<input type="checkbox"/> BEPPOSAX	<input type="checkbox"/> BeppoSAX/GRBM Gamma-Ray Burst Catalog 8		
<input type="checkbox"/> CGRO	<input type="checkbox"/> CGRO/BATSE 4B Catalog 5	<input type="checkbox"/> CGRO/BATSE Trigger Data 22	<input type="checkbox"/> CGRO/EGRET Photon Lists and Maps 11

- Select ROSAT all-sky survey source list

<input type="checkbox"/> ROSAT	<input type="checkbox"/> ROSAT Archival Data 3	<input type="checkbox"/> ROSAT Observation Log 81	<input type="checkbox"/> ROSAT Archival WFC EUV Data 1
	<input type="checkbox"/> ROSAT Catalog PSPC WGA Sources 1	<input type="checkbox"/> Hamburg/RASS Catalog: X-Ray Sources 1	<input checked="" type="checkbox"/> ROSAT All-Sky Survey: Bright Sources 1
	<input type="checkbox"/> ROSAT All-Sky Survey Archival Data 2	<input type="checkbox"/> ROSAT Bright Survey (Schwope et al. 2000) 1	<input type="checkbox"/> ROSAT Results Archive Sources for the PSPC 1
	<input type="checkbox"/> All-Sky Optical Catalog of Radio/X-Ray Sources 1	<input type="checkbox"/> Hamburg/RASS Catalog: Optical Identifications 2	<input type="checkbox"/> ROSAT All-Sky Survey/ASIAGO-ESO QSO Survey Catalog 1
	<input type="checkbox"/> ROSAT Complete Results Archive Sources for the PSPC 1	<input type="checkbox"/> ROSAT All-Sky Survey Completely Identified Northern Sample 1	<input type="checkbox"/> ROSAT All-Sky Survey BSC/2MASS PSC Cross-Associations XID II Catalog 1
	<input type="checkbox"/> ROSAT All-Sky Survey Bright Source Catalog USNO A2 Cross-Associations 2		

- ROSAT PSPC count rate is 0.99 cts/sec

[Query Information](#) | [Query Results](#) | [Data Products Retrieval](#) | [Help](#)

Click mission tabs (middle tab level) to display table tabs. Move cursor over tabs to see more information.

Table Legend:

Display all parameters for a row
 Sort by a column in order: 1,2,3 Sort by column in reverse order: 3,2,1 Current table sort
 Services links: O: Digitized Sky Survey image, R: ROSAT All-Sky Survey image, N: NED objects near coordinates,
 S: SIMBAD objects near coordinates, D: get list of data products, B: ADS bibliography holdings, F: FOV plot for observation

Data Products: Click checkbox to add row to Data Product Retrieval List

[ROSAT All-Sky Survey: Bright Sources \(rassbsc\)](#)

Search radius used: 2.00 '

Select	Related Links	Services	name	ra	dec	count rate	count rate error	hardness ratio 1	hardness ratio 1 error	Search Offset
<input type="checkbox"/> All						[ct/s]	[ct/s]			['] from (target)
<input checked="" type="checkbox"/>	2MASS USNOA2	O R N S	1RXS J081228.3+623627	08 12 28.30	+62 36 27.5	0.99	0.05	0.19	0.05	0.084 (su uma)

1 row retrieved from rassbsc

Further Actions:

Do you want to your rassbsc results? [\(help\)](#)

Do you want to your rassbsc results with another catalog or table? [\(help\)](#)

- Convert to flux using given spectrum in WebPIMMS

[HELP](#)
WebPIMMS
 A Mission Count Rate Simulator
 Powered by [PIMMS v4.6c](#)

Access the multiple component model [interface](#).

Convert From:	Into:
ROSAT/PSPC Count Rate ▾	FLUX ▾

Examples of Common FLUX Input/Output Ranges ▾

Input Energy Range (low-high): <input type="text" value="default"/>	<input checked="" type="radio"/> keV	Units
	<input type="radio"/> Angstroms	
Output Energy Range (low-high): <input type="text" value="2-10"/>	<input checked="" type="radio"/> keV	Units
	<input type="radio"/> Angstroms	

Source: Flux / Count Rate <input type="text" value="0.99"/>	(erg/cm ² /s)
	(counts/s)

Galactic nH	Redshift	Intrinsic nH
<input type="text" value="1e20"/> (cm ⁻²)	<input type="text" value="none"/>	<input type="text" value="none"/> (cm ⁻²)

Model of Source:	Model Parameters
<input type="radio"/> Power Law	Photon index: <input type="text"/>
<input type="radio"/> Black Body	keV: <input type="text"/>
<input type="radio"/> Therm. Bremss.	kT: <input type="text"/>
<input checked="" type="radio"/> APEC	<input type="text" value="1.0 Solar Abundance"/> ▾ <input type="text" value="7.85 6.1006"/> ▾

- Giving:

FLUX

PIMMS predicts a flux (2.000- 10.000keV) of 1.512E-11 ergs/cm/cm/s

Unabsorbed FLUX

PIMMS predicts an unabsorbed flux (2.000- 10.000keV) of 1.514E-11 ergs/cm/cm/s

- Now converting instead to XMM-Newton count rates and scrolling down to the RGS (reflection grating spectrograph)

XMM RGS1 O1

PIMMS predicts 1.801E-01 cps with XMM RGS1 O1

XMM RGS1 O2

PIMMS predicts 6.234E-02 cps with XMM RGS1 O2

XMM RGS2 O1

PIMMS predicts 2.199E-01 cps with XMM RGS2 O1

XMM RGS2 O2

PIMMS predicts 5.845E-02 cps with XMM RGS2 O2

- Giving a total count rate (both orders of both RGS instruments) of 0.47 cts/sec and 20,000 counts in 43 ks

- Finally assess SU UMa visibility with XMM-Newton using visibility tool on XMM Science Operations Centre (SOC) webpage

XMM-Newton Multi-Target Visibility Checker

Check the visibility of any location for the XMM-Newton Observatory with this tool.

There are three methods of checking visibility;

- [SIMBAD or NED lookup](#) - lookup a single object name and then calculate visibility with the returned RA & Dec coordinates.
- [Single Target Visibility](#) - calculate visibility using known RA & Dec coordinates.
- [Multiple Target Visibility](#) - calculate visibility using a list of known RA & Dec coordinates.

The output information can be reduced by specifying restrictions like range of revolutions and minimum visibility time for the target. The visibility is determined from a DataBase of Observable Bins (DBOB), each bin corresponding to a size of 2x2 degrees.

Further information about the XMM-Newton orbit details and viewing constraints as well as a description of the DBOB can be found on the [XMM-Newton Orbit & Constraint Details](#) page.

Details about the behaviour of the XMM-Newton background are given in the following Technical Note: [The Behaviour of the XMM-Newton Background](#).

For further information on the use of this tool and a description of the different parameters, please see our [Vischeck Howto](#).

SIMBAD or NED Lookup

Please enter an object name to look it up in SIMBAD or NED;

Target Name (eg; Abell 1750)

Please note; there is a 30 second timeout should SIMBAD or NED not respond.

Single Target Visibility

To calculate the visibility of a single target, please complete the following fields and "Submit" your request.

Target Details

- Many visibility windows in Mar-May and Sept-Nov
 - But visibility is poor and longest windows are only 12ks
 - So observations must be split across at least 4 XMM orbits.

Search Results per Target

Target Name	RA	Dec
SU UMa	123.1177	62.6063

Rev.	Vis. Start (yyyy-mm-dd hh:mm)	Vis. Window Duration (secs)	Vis. End (yyyy-mm-dd hh:mm)	Rounded Vis.	Visibility Start Phase	Visibility End Phase	Solar Aspect Angle(°)	Mean Astronomical Position Angle(°)
2612	2014-03-15 17:32	10667	2014-03-15 20:30	10000	0.82	0.89	108.1	303.6
2613	2014-03-17 17:24	10091	2014-03-17 20:12	10000	0.82	0.88	106.7	302.1
2614	2014-03-19 17:15	10095	2014-03-19 20:03	10000	0.82	0.88	105.2	300.7
2615	2014-03-21 17:07	10044	2014-03-21 19:55	10000	0.82	0.88	103.7	299.3
2616	2014-03-23 17:01	9337	2014-03-23 19:36	5000	0.82	0.88	102.3	297.9
2617	2014-03-25 16:54	9230	2014-03-25 19:28	5000	0.82	0.88	100.8	296.6
2618	2014-03-27 16:47	9187	2014-03-27 19:20	5000	0.82	0.88	99.3	295.2
2619	2014-03-29 16:39	8585	2014-03-29 19:02	5000	0.82	0.87	97.8	293.9
2620	2014-03-31 16:31	8557	2014-03-31 18:53	5000	0.82	0.87	96.3	292.6
2621	2014-04-02 16:23	8487	2014-04-02 18:45	5000	0.83	0.87	94.8	291.2
2622	2014-04-04 16:17	8398	2014-04-04 18:37	5000	0.83	0.87	93.3	289.9
2623	2014-04-06 16:11	7721	2014-04-06 18:19	5000	0.83	0.87	91.9	288.6
2624	2014-04-08 16:04	7670	2014-04-08 18:12	5000	0.83	0.87	90.4	287.3
2625	2014-04-10 15:57	7652	2014-04-10 18:04	5000	0.83	0.87	88.9	286.0
2626	2014-04-12 15:49	7655	2014-04-12 17:57	5000	0.83	0.87	87.4	284.8
2627	2014-04-14 15:41	7660	2014-04-14 17:49	5000	0.83	0.87	85.9	283.5
2628	2014-04-16 15:33	7629	2014-04-16 17:40	5000	0.83	0.87	84.4	282.2
2629	2014-04-18 15:26	6936	2014-04-18 17:22	5000	0.83	0.87	83.0	280.9
2630	2014-04-20 15:20	6799	2014-04-20 17:13	5000	0.83	0.87	81.5	279.5
2631	2014-04-22 15:14	6692	2014-04-22 17:05	5000	0.83	0.87	80.0	278.2
2632	2014-04-24 15:06	6651	2014-04-24 16:57	5000	0.83	0.87	78.6	276.9
2633	2014-04-26 14:58	7224	2014-04-26 16:58	5000	0.83	0.87	77.1	275.6
2634	2014-04-28 14:50	7162	2014-04-28 16:49	5000	0.83	0.87	75.7	274.2
2635	2014-04-30 14:43	7061	2014-04-30 16:41	5000	0.83	0.87	74.3	272.8
2636	2014-05-02 14:37	6949	2014-05-02 16:33	5000	0.83	0.87	72.8	271.4
2637	2014-05-04 14:31	6858	2014-05-04 16:25	5000	0.83	0.87	71.4	270.0
2706	2014-09-19 06:22	12220	2014-09-19 09:46	10000	0.86	0.93	72.7	122.7
2707	2014-09-21 06:14	12219	2014-09-21 09:38	10000	0.86	0.93	74.2	121.3
2708	2014-09-23 06:06	12242	2014-09-23 09:30	10000	0.86	0.93	75.6	120.0