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Multi-Wavelength Studies of ELAIS-N1 Radio Sources using SPITZER and GALEX Mission Catalogs

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1. INTRODUCTION

This report describes the initial results of a source-match study of Radio sources gathered from the GMRT mission in the ELAIS-N1 field corresponding to sources in the Infrared and Ultraviolet spectral regions using the SPITZER and GALEX mission catalogs. The data from SERVS and SWIRE mission of the SPITZER mission was utilised. These included the SPITZER 24 μm catalog, SPITZER 70 μm catalog, SPITZER 160 μm catalog, SPITZER Spring '05 catalog, SPITZER 3.6 μm catalog, SPITZER 4.5 μm catalog, and the SPITZER 2-band catalog. The center of the box searched in the relevant SPITZER and GALEX catalogs was RA = 16h10m30.119s and Dec = +54d34m24.933s. The downloaded data was stored in CSV file formats for further analysis and processing.

2. METHODOLOGY

The primary platform utilised in this study for source-matching and analysis was Python, more specifically NumPy Arrays. The GMRT and corresponding SPITZER or GALEX catalogs were loaded into NumPy Arrays and a linear search algorithm was implemented to find and output source data for sources that were present in a 10" radius around every GMRT Radio source onto a new file. This process was repeated for all the catalogs and the statistics of the number of matches was noted. This complete process was then repeated to identify source-matches in a reduced 5" radius.

3. RESULT

The number of the number of sources in SPITZER/GALEX matching a single GMRT Radio source (Noted by columns: Zero, One, Two, Three...) are noted in the table below.

Catalog	Radius	GMRT Count	Zero	GLX/SPZ Count	One	Two	Three	Four	Five	Six	Seven	Eight
GALEX	10"	380/1438	1185	1058	80	83	69	63	37	42	5	1
	5"	227/1438	1211	675	48	53	49	33	24	18	2	0
SPZ 24 μm	10"	404/1438	1034	412	396	8	0	0	0	0	0	0
	5"	362/1438	1076	362	362	0	0	0	0	0	0	0
SPZ 70 μm	10"	119/1438	1319	119	119	0	0	0	0	0	0	0
	5"	105/1438	1333	105	105	0	0	0	0	0	0	0
SPZ 160 μm	10"	45/1438	1393	45	45	0	0	0	0	0	0	0
	5"	12/1438	1426	12	12	0	0	0	0	0	0	0
SPZ Spring 2005	10"	545/1438	893	732	390	126	27	1	1	0	0	0
	5"	409/1438	1029	428	391	17	1	0	0	0	0	0
SPZ 3.6 μm	10"	440/1438	998	667	281	105	41	12	1	0	0	0
	5"	291/1438	1147	309	273	18	0	0	0	0	0	0
SPZ 4.5 μm	10"	465/1438	973	681	295	135	27	6	1	1	0	0
	5"	272/1438	1166	292	252	20	0	0	0	0	0	0
SPZ 2-band	10"	281/1438	1157	356	217	54	9	1	0	0	0	0
	5"	174/1438	1264	176	172	2	0	0	0	0	0	0