

# NASA/IPAC EXTRAGALACTIC DATABASE



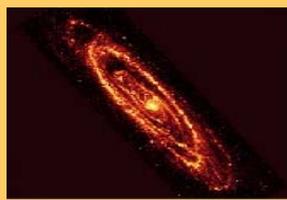
The NASA/IPAC Extragalactic Database (NED) is a thematic online research facility designed to support scientists, educators, space missions and astronomical observatories in the planning, execution and publication of research on objects beyond our Milky Way galaxy. NED's ongoing mission is to provide the most comprehensive and easy-to-use multi-wavelength database of fundamental measurements for known (cataloged and published) objects beyond the Milky Way. NED is a portal into a systematic fusion of data linked from hundreds of sky surveys and thousands of research publications. The contents and services span the entire spectrum from gamma rays through radio frequencies, and they are continuously updated to reflect the current literature and releases of large-scale sky survey catalogs. NED has been on the Internet since 1990, growing in content and capabilities with the evolution of information technology. NED is operated by the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.

Inside you will find descriptions of NED's primary features, samples of its rapidly growing contents, and illustrations of powerful new services to facilitate your research.

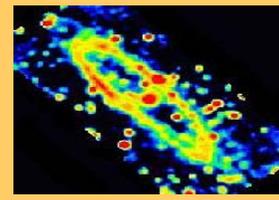
The NED team may be contacted at [ned@ipac.caltech.edu](mailto:ned@ipac.caltech.edu)



GALEX UV



SPITZER MID-IR



EFFELSBERG RADIO

<http://nedwww.ipac.caltech.edu>



**NASA/IPAC EXTRAGALACTIC DATABASE**

- Spectra
- Derived Values - Corrected Velocities, Hubble Flow Distances and Scales
- Literature Filters with Data Content & Topical Keywords
- 116,564 SDSS DR5 galaxies and QSOs with Redshifts
- NED Database of Distances, Level 4 (NED-ID)
- News - Contents and Capabilities
- Frames

OBJECTS	DATA	LITERATURE	TOOLS	INFO
By Name	Images By Object Name or By Region	References by Object Name	Coordinate Transformation & Extinction Calculator	FAQ Introduction
Near Name	Photometry & SEDs	References by Author Name	Cosmology Calculators	Features
Near Position	Spectra	Text Search	Extinction-Law Calculators	NED Source List
Advanced All-Sky	Redshifts	Knowledgebase	FTP	Team
IAU Format	Positions	Abstracts	XY offset to RA/DEC	Comment
By Refcode	Notes	Thesis Abstracts	Batch Job Submission	Web Links
	Diameters		Pick Up Batch Job Results	Glossary & Lexicon
			Skyplot	

Interface last updated: 12 Dec 2006  
 \* 9.5 million objects  
 \* 14.7 million multi-wavelength object cross-IDs  
 \* 188 thousand associations (candidate cross-IDs)  
 \* 1.3 million redshifts  
 \* 26.2 million photometric measurements

Database last updated: 12 Dec 2006  
 \* 3.6 million diameter measurements  
 \* 3.6 million objects linked to 65,000 refereed journal articles  
 \* 2.3 million images, maps and external links  
 \* 50 thousand notes  
 \* 42 thousand abstracts

If your research benefits from the use of NED, we would appreciate the following acknowledgement in your paper:  
 This research has made use of the NASA/IPAC Extragalactic Database (NED) which is operated by the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.

**NASA/IPAC EXTRAGALACTIC DATABASE**

Searching NED for object "JC 279"

1 objects found in NED: Skyplot(100)

Object Name	RA	DEC	Redshift	Distance	Notes
JC 279	125.885	12.279	0.000	0.000	

**Multi-wavelength Cross-IDs**

**Basic Data**

**NEW**  
**Derived Values**  
 Details on page 4.

**Links into NED: Photometry, Images, Diameters, Positions, Redshifts, Spectra, Notes.**

**Links to External Archives**

### Primary NED Services

NED is the world's largest database of cross-identified extragalactic objects, containing approximately 10 million unique objects and 15 million multi-wavelength cross-IDs. Over 3 thousand catalogs and published lists covering the entire electromagnetic spectrum have had their objects cross-identified or associated and their data fused into the database for easy queries and retrieval.

Objects can be queried By Name (any alias) using the NED name interpreter; Near Name or Near Position (cone search); By Reference (Refcode), and By Author. By Parameter (Advanced All-Sky) queries utilize joint constraints on Redshift, Sky Area, Object Types, Survey Names, and Flux density/magnitude to construct galaxy samples. The complexities of SQL are hidden from the user by the NED software and interface.

Available data include Positions, Redshifts, Morphological and Spectral Classifications, Photometry, Images, Spectra (New!), Diameters, Cross-IDs, Associations, Reference Abstracts and detailed Notes. Measurement uncertainties are included where available, and all information is cited and linked to the on-line literature via ADS.

Other tools include a Coordinate Calculator that performs conversions and precession and displays line-of-sight Galactic extinction estimates; a Velocity Calculator that converts between Heliocentric, Local Group, Galactic Standard of Rest, and 3K Microwave Background; and an XY-Offset to RA/Dec converter.

### Seamless Connectivity

Globally distributed services are linked by object names and positions in NED. See page 5 for details.

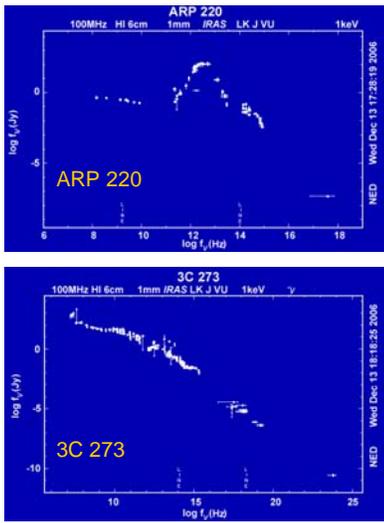


**Knowledgebase for Extragalactic Astronomy & Cosmology**  
 See page 10 for details.



### Links to On-line Literature

Data in NED are cited and linked to the on-line journals via ADS. Abstracts may be queried individually from specific data entries, or in groups By Object, By Author, or full Text Search.



## Spectral Energy Distributions

NED provides Spectral Energy Distributions (SEDs) covering the whole electromagnetic spectrum. Fluxes and their uncertainties (or upper limits), gathered from large survey catalogs and from the literature, are displayed in various user-requested standardized units. Aperture information and ties to the originating literature are provided for every data point. Great care goes into understanding and documenting the details of the measurements (metadata), and the data are provided to users in original published units (magnitudes, Janskys, etc.), and uniformly converted to various standard units for display and SED plotting.

NASA/IPAC EXTRAGALACTIC DATABASE  
Help | Contact | NED Home

Photometric data point(s) for object ARP 220

26 photometry data points found in NED.

No.	Frequency Tagged	Measurement	Flux	Units	Reference Code	
1	17.01_25	14.27	nc	0.13	mag	UNIRCS19.C.00014
2	17.01_25	13.87	nc	0.13	mag	UNIRCS19.C.00014
3	8.00_25	13.84	nc	0.14	mag	UNIRCS19.C.00014
4	8.00_25	13.80	nc	0.20	mag	UNIRCS19.C.00014
5	8.00_25	13.61	nc	0.14	mag	UNIRCS19.C.00014
6	9.01_25	13.30	nc	0.14	mag	UNIRCS19.C.00014
7	9.01_25	12.96	nc	0.14	mag	UNIRCS19.C.00014
8	IRAS 12 micron	4.87E+01	nc	1%	Jy	UNIRAS19.C.00004
9	IRAS 12 micron	0.64	nc	0.020	Jy	IRSAJ_00_7603
10	IRAS 22 micron	7.92	nc	0.030	Jy	IRSAJ_00_7603
11	IRAS 25 micron	7.907E+00	nc	1%	Jy	UNIRAS19.C.00008
12	IRAS 60 micron	1.038E+02	nc	4%	Jy	UNIRAS19.C.00008
13	IRAS 60 micron	103.33	nc	0.144	Jy	IRSAJ_00_7603
14	IRAS 100 micron	1.114E+02	nc	1%	Jy	UNIRAS19.C.00008
15	IRAS 100 micron	113.05	nc	0.207	Jy	IRSAJ_00_7603
16	335 micron	0.53	nc	3.3	Jy	IRSAJpt_200_8306
17	455 micron	3	nc	1.1	Jy	IRSAJpt_200_8306
18	850 micron	1.1	nc	0.4	Jy	IRSAJpt_200_8306
19	1150 micron	0.6	nc	0.1	Jy	IRSAJpt_200_8306
20	1.27 mm	0.236	nc	0.01	Jy	IRSAJpt_104_00667
21	4.32 GHz	204	nc	27	mJy	IRSAJpt_73_10110
22	4.32 GHz	200	nc	13%	mJy	IRSAJpt_73_10110
23	161 GHz (m band)	13.96	nc	0.20	mJy mag	UNIRCS19.C.00014
24	161 GHz (m band)	21.11	nc	0.14	Jy km s <sup>-1</sup>	UNIRAS19.C.00008
25	1.40 GHz	302	nc	0.1	mJy	IRSAJpt_76_20119
26	175 MHz	0.47	nc	10.1%	Jy	UNIRAS19.C.00008

NASA/IPAC EXTRAGALACTIC DATABASE  
Help | Contact | NED Home

### Images and maps in NED archive for object [MESSIER 051](#)

Visualize and interact with FITS images by clicking on one of the icons (Aladin or OASIS) when present in the "View & Overlay" column.

Preview	FITS-JSON File	More Information	View & Overlay	Band, Wavelength	Image Size (arcmin)	Res. (arcsec)	Telescope	Refcode
	1218kB FITS image Header	Display FITS Header		103kB 6450A	22.0 x 22.0 ChangeSize	1.70	Panoramic4-inch Schmidt	19FACD3_1_0000
	104kB JPG image	N/A	N/A	57.5M				
	1301kB FITS image Header	Display FITS Header		1.5GHz 20cm				
	1157kB FITS image Header	Display FITS Header		1.5GHz 20cm				

Aladin sky atlas

## Multi-wavelength Images and Visualization

NED provides a unique collection of images which are interconnected, documented, and available for queries and immediate download. The science-grade images in FITS format are highly processed data submitted by researchers around the world after publication (in plot form) in the peer-reviewed literature. Galaxy images from 2MASS, DSS, and other major surveys are also available. In 2003 we introduced the capability to search the NED image archive by sky areal coverage. Sky visualization and interactivity between images and database entries are provided via Aladin (CDS) and OASIS (IRSA). Clicking on the the Aladin icon launches the Java applet with the corresponding image loaded along with marker overlays for objects in NED and separate planes for the USNO (optical), 2MASS (near-infrared) and NVSS (radio) catalogs.

## Spectral Database

See page 8 for details.

NEW

Spectral data in NED archive for object [NGC 4666](#)

Slit Orientation	Spectrum Previews	Retrieve Data	Observational Information	Spectral Coverage & Resolution
		FITS/NA Author: ASCI 4.4kb NED: ASCI 12.9kb VOTable 12.5kb External Resource  Reference: 2004AJ...128...16K	Region: Integrated Telescope: Parkes Instrument: 21 cm Mullbeam Receiver Abs-Cal: Yes Ref-Frm: Observed <a href="#">Full description</a>	Line: H I From: 908.2kms <sup>-1</sup> To: 2199.1kms <sup>-1</sup> Step: 13.2kms <sup>-1</sup> Resolution: 16.0kms <sup>-1</sup>
		FITS 4.7kb Author: ASCI 25.7kb NED: ASCI 131.6kb VOTable 122.7kb  Reference: 1995ApJS...99...122K	Region: Nucleus Telescope: MKO 2.2m Instrument: Fairt Object Spectrograph Abs-Cal: Yes Ref-Frm: Observed <a href="#">Full description</a>	Band: Optical From: 4747.7A To: 7770.0A Step: 2.8A Resolution: 7.0A

## Data Content and Topical Keywords

See page 7 for details.

Galaxies and Quasars	Galaxy Properties	Parts of Galaxies	Stellar Populations
Active Galactic Nuclei Active Galaxies Active Nuclei Asymmetric Galaxies Barred Spirals BL Lacertae Objects Brazes Blue Compact Galaxies Blue Galaxies Bright Galaxies Central Galaxies Classification Coma Compact Galaxies Compact Groups Compact Objects Companions D Galaxies Double Galaxies	Absolute Magnitudes Absorption Systems Abundance Gradients Abundances Accretion Ages Angular Diameters Angular Momentum Annihilation of Disks Apparent Magnitudes Asymmetry Atlases Birthing Bolometric Corrections Bolometric Magnitudes Brightness Brightness Distribution Brightness Temperature Disk Galaxies Brightness Variations	Accretion Disk Accretion Disks Associations Black Holes Bow Shocks Bridges Broad-Line Regions	Bright Giants Bright Stars Brown Dwarfs BY Draconis Stars Carbon Stars Cataclysmic Variables Central Stars



NEW!

# Corrected Velocities & Distances



One of the most frequently requested NED enhancements has arrived! When redshifts are available, data for galaxies now include corrected velocities, Hubble flow distances and scales, and cosmology-corrected quantities.

Derived Values based on the object's redshift (if known) and position:

- Calculated and Corrected Velocities, with errors:
  1. V (Heliocentric) in km/s with its error (if known) and source, calculated from  $V = z/c$ . No relativistic correction is applied to these apparent redshifts (see [John Huchra's discussion of extragalactic redshifts](#) for more information)
  2.  $\bar{V}$  (Galactocentric GSR) in km/s calculated as in [RC3](#),
  3. V (Local Group) in km/s based on the formulation by Karachentsev and Makarov ([AJ 111, 794, 1996](#))
  4. V (3K CMB) in km/s using the CMB dipole model presented by Fixen et al. ([ApJ 473, 576, 1996](#))
  5. V (Virgo Infall only) based on the local velocity field model given in Mould et al. ([ApJ 529, 786, 2000](#)) using only the term for the influence of the Virgo Cluster
  6. V (Local Infall) based on the local velocity field model given in Mould et al. ([ApJ 529, 786, 2000](#)) using the terms for the influence of the Great Attractor and the Shapley Supercluster, as well as the Virgo Cluster (we thank Jim Condon for his code for this model, on which we have based ours. Note that the declinations of the Great Attractor and the Shapley Supercluster given in Table A1 of Mould et al are negative, and that the minus signs in their Equation A2 should all be positive).

The errors in the model parameters for each correction are added in quadrature to the error in the galaxy's redshift as follows: 4% of the GSR correction, 6% of the Local Group correction, 7% of the 3K CMB correction, and 7% of the velocity field correction. No derived distance is given if the corrected velocity is negative.

- Hubble Flow Distances and Distance Moduli, with their errors, calculated from the apparent corrected velocities assuming  $H_0 = 73 \pm 5$  km/s/Mpc.
- Scale at the Hubble Flow Distances, in parsec/arcsec, kiloparsec/arcsec, kiloparsec/arcmin, and megaparsec/degree.
- Several quantities derived from the redshift corrected to the reference frame defined by the 3K background, and further corrected for a cosmological model with  $H_0 = 73$  km/s/Mpc,  $\Omega_{\text{matter}} = 0.27$ , and  $\Omega_{\text{vacuum}} = 0.73$ . We thank Dr. Chris Burns (OCIW) for the code behind these calculations. Further explanation of the calculated quantities is available through Ned Wright's [Cosmology Calculator](#) web site, and through Alberto Cappi's [CosmoTools](#) web site.

## Sample output for IRAS F10214+4724 at heliocentric $z = 2.28560$

### Derived Values NEW

#### Calculated and Corrected Velocities

V (Heliocentric)	: 685206 +/-	9 km/s	<a href="#">1993ApJ...414L..13D</a>
V (Galactocentric GSR)	: 685234 +/-	9 km/s	<a href="#">1991RC3..9..C...0000d</a>
V (Local Group)	: 685234 +/-	9 km/s	<a href="#">1996AJ...111..794K</a>
V (3K CMB)	: 685418 +/-	17 km/s	<a href="#">1996ApJ...473..576F</a>
V (Virgo Infall only)	: 685380 +/-	14 km/s	<a href="#">2000ApJ...529..786M</a>
V (Local Infall)	: 685317 +/-	14 km/s	<a href="#">2000ApJ...529..786M</a>

#### Hubble Flow Distance and Distance Modulus (where $H = 73 \pm 5$ km/sec/Mpc)

D (Galactocentric GSR)	: 9387 +/-	657 Mpc	(m-M) = 44.86 +/- 0.15 mag
D (Local Group)	: 9387 +/-	657 Mpc	(m-M) = 44.86 +/- 0.15 mag
D (3K CMB)	: 9389 +/-	657 Mpc	(m-M) = 44.86 +/- 0.15 mag
D (Virgo Infall only)	: 9389 +/-	657 Mpc	(m-M) = 44.86 +/- 0.15 mag
D (Local Infall)	: 9388 +/-	657 Mpc	(m-M) = 44.86 +/- 0.15 mag

#### Scale at Hubble Flow Distances

Scale (Galactocentric GSR)	: 45508 pc/arcsec = 45.508 kpc/arcsec = 2730.50 kpc/arcmin = 163.83 Mpc/degree
Scale (Local Group)	: 45508 pc/arcsec = 45.508 kpc/arcsec = 2730.50 kpc/arcmin = 163.83 Mpc/degree
Scale (3K CMB)	: 45520 pc/arcsec = 45.520 kpc/arcsec = 2731.23 kpc/arcmin = 163.87 Mpc/degree
Scale (Virgo Infall only)	: 45518 pc/arcsec = 45.518 kpc/arcsec = 2731.08 kpc/arcmin = 163.86 Mpc/degree
Scale (Local Infall)	: 45514 pc/arcsec = 45.514 kpc/arcsec = 2730.83 kpc/arcmin = 163.85 Mpc/degree

#### Cosmology-Corrected Quantities [ $H_0 = 73$ km/sec/Mpc, $\Omega(\text{matter}) = 0.27$ , $\Omega(\text{vacuum}) = 0.73$ ]

[Redshift 2.286307 corrected to the Reference Frame defined by the 3K Microwave Background Radiation]

Luminosity Distance	: 18059 Mpc	(m-M) = 46.28 mag
Angular-Size Distance	: 1672 Mpc	(m-M) = 41.12 mag
Co-Moving Radial Distance	: 5495 Mpc	(m-M) = 43.70 mag
Co-Moving Tangential Dist.	: 5495 Mpc	(m-M) = 43.70 mag
Co-Moving Volume	: 695 Gpc <sup>3</sup>	
Light Travel-Time	: 10.447 Gyr	
Age at Redshift 2.286307	: 2.852 Gyr	
Age of Universe	: 13.299 Gyr	
Scale (Cosmology Corrected)	: 8107 pc/arcsec = 8.107 kpc/arcsec = 486.41 kpc/arcmin = 29.18 Mpc/degree	
Surface Brightness Dimming	: Flux Density per Unit Area = 0.00857; Magnitude per Unit Area = 5.167 mag	



# Global Connectivity

NED provides seamless connectivity to globally distributed services, serving as a thematic Virtual Observatory portal.

The External Archives and Services section of NED query result pages contains **simple 1-click access** to distributed images, catalog data, and observation log entries.

## THE ASTROPHYSICAL JOURNAL

The Astrophysical Journal, 629(1-2), 2005 August 15  
© 2005 The American Astronomical Society. All rights reserved. Printed in U.S.A.

**Silicate Emissions in Active Galaxies: From LINERs to QSOs**

E. Sturm, M. Schweizer, D. Lutz, A. Contursi, R. Genzel, M. D. Lehnert, and L. J. Tacconi  
Max-Planck-Institut für extraterrestrische Physik, Postfach 1312, D-85748 Garching, Germany; [sturm@mpie-garching.mpg.de](mailto:sturm@mpie-garching.mpg.de)  
S. Veilleux, D. S. Rupke, and D.-C. Kim  
Department of Astronomy, University of Maryland, College Park, MD 20742  
A. Sternberg and D. Maoz  
School of Physics and Astronomy, Tel Aviv University, Ramat Aviv, Tel Aviv 69978, Israel  
S. Lord and J. Mazzarella  
IPAC, California Institute of Technology, MS 100-22, Pasadena, CA 91125 and  
D. B. Sanders  
Institute for Astronomy, University of Hawaii, 2680 Woodlawn Drive, Honolulu, HI 96822

Received 2005 May 13; accepted 2005 June 28; published 2005 July 25

ABSTRACT

### External Archives and Services

External Archives and Services [Help](#)

Data Related Directly to Object Names

RUN QUERY	Site/Service
Query SIMBAD by primary NED object name - NGC 4151	SIMBAD (U.S. mirror, CIA-Harvard)
Revised New General Catalogue - NGC 4151	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Uppsala General Catalogue - UGC 07166	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Original Zwicky Catalogue - GC 215-045	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Sloan LSC Spectral Archive (SLOANs) search radius	Locked Query Catalog Data (Harvard/SAC)
Morphological Catalog of Galaxies - MCG -07-25-044	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
The Second Bologna Survey - B2 1200-39	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
The Third Bologna Survey - B3 1200-396	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
2MASX Extended Source Images (E-ESI) - 2MASX J12103265+3924207	NASA/IPAC Infrared Science Archive (IRSA)
2MASX Extended Source Images (E-ESI) - 2MASX J12103493+3924207	NASA/IPAC Infrared Science Archive (IRSA)
Catalogue of Extragalactic Galaxies - CGCG 038739	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Retrieve mean data from LEDA - PGC 038739	The Lyon-Mexican Extragalactic Database (LEDA)
Original FIRST Source Catalog - FIRST J121032.5+392420	Fast Images of the Radio Sky at Twenty-Centimeters
FIRST Survey, Version 1999M - FIRST J121032.5+392420	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Texas Survey of radio sources at 30MHz - TSS 1201+396	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
SDR Catalog of radio sources - SDR J1210-3924	ViewR Catalog Query (U.S. mirror, CIA-Harvard)
Query GALEX (G15) (U.S. Mirror Archive) (Search radius) - NGC 4151	GALEX Mission Data Archive at MAST
General Archive Resources - All queries centered at 12h10m32.6s, +39d24m21s (J2000)	
RUN QUERY	Site/Service
Query Optical and UV Mission Archives (Default search radius)	Multimission Archive at STScI (MAST)
Query High Energy Mission Archives (Default search radius)	HEASARC (NASA/GSFC)
Explore resources with ADS (default 150 search radius)	HEASARC (NASA/GSFC)
Query SIMBAD with 2 search radius (Internal NED only)	SIMBAD (U.S. mirror, CIA-Harvard)
Retrieve 2MASX Atlas Images (Band(s))	Astrophysics Data Facility (NASA/GSFC)
Retrieve IRAS (SSA Images) (Band(s))	NASA/IPAC Infrared Science Archive (IRSA)
T.O. Credit of IRAS Scans (ADSCANS/GANES)	NASA/IPAC Infrared Science Archive (IRSA)
Retrieve NVSS Image	IRAO/NSA Sky Survey (NVSS)
Retrieve FIRST Image	Fast Images of the Radio Sky at Twenty-Centimeters
IRAO Archive 1 secondary search radius (GET, VLA and VLA)	The NRAO Data Archive System

Distributed data are dynamically cross-linked using source names and positions indexed and maintained by NED. New services are linked as they become available. Further VO connectivity is in development.

Distributed services are also highly connected to NED.

Observatory control systems and various Internet sites query NED for a variety of services, including accessing positions, redshifts and basic data on galaxies, resolving names, receiving images, etc.

# New! NED VO Capabilities & Tabular Output

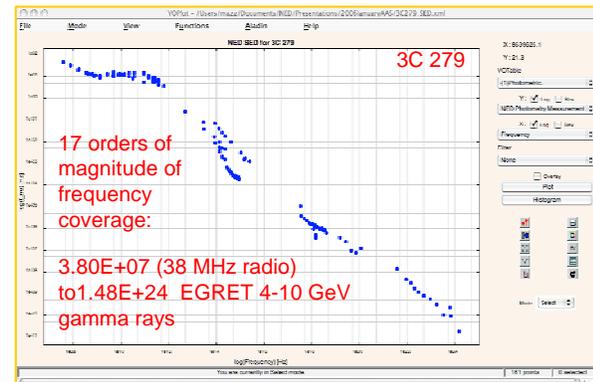
## Spectral Energy Distribution Data Tables

VOTable and simple ASCII output options

- HTML Preformatted text (faster to display)
- HTML table
- Text (ASCII) table - Bar Separated Values of Main Source Table
- Text (ASCII) table - Tab Separated Values of Main Source Table
- XML VOTable

Plain ASCII → Easy import into Excel, etc.

VOTable → Interactive visualization with VOPlot, Specview, etc.

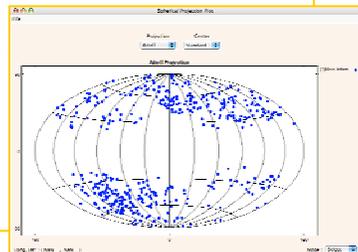


Plot the spatial distribution of an Allsky (By Parameter) query with constraints on redshift, flux density (mag), object types, survey membership and cross-IDs

- HTML Preformatted text (faster to display)
- HTML table (Slower to display for large tables)
- Text (ASCII) table - Bar Separated Values of Main Source Table
- Text (ASCII) table - Tab Separated Values of Main Source Table
- XML VOTable of Main Source Table
- XML VOTable of Source Names(Cross-IDs)
- XML VOTable of Position Data
- XML VOTable of Basic Data
- XML VOTable of External Archives and Services
- XML VOTable of all tables for the object(s)

VOTable output options

```
<VOTABLE version="1.0">
+ <DEFINITIONS><DEFINITIONS>
-<RESOURCE type="results">
-<DESCRIPTION>
Results from query to NASA/IPAC Extragalactic Database (NED), which is operated by the Jet Propulsion Laboratory,
ASTOR/22449 with The Johns Hopkins University.
-<DESCRIPTION>
-<INFO name="QUERY_STATUS" value="OK"/>
-<TABLE ID="NED_Allsky_MainTable" name="Main Information Table for All Sky, chosen by param">
-<LINK content="query" content-type="char">
-<FIELD>
"mp://nedwww.ipac.caltech.edu/cgi-bin/nph-NEDallsky?z_constraint=Unconstrained&z_value=0.000000&z_value
Tmax&flux_value=300.000000&flux_value2=0.000000&flux_unit=mjy&dist_constraint=Unconstrained&out_includ
-<FIELD>
Main information about object (Core Search results)
-<DESCRIPTION>
-<PARAM name="Equinox" datatype="char" ucd="time.equinox" value="J2000.0"/>
-<PARAM name="CoordSystem" datatype="char" ucd="pos.system.coord" value="Equatorial"/>
-<FIELD ID="main_col1" name="No." ucd="meta.id" datatype="int">
+ <DESCRIPTION><DESCRIPTION>
-<FIELD>
-<FIELD ID="main_col2" name="Object Name" ucd="meta.id.meta.main" datatype="char" arraysize="30"><FIELD
-<FIELD ID="main_col3" name="pos_ra_eq" ucd="pos.eq.ra.meta.main" datatype="double" unit="degrees"><FIELD
-<FIELD ID="main_col4" name="pos_dec_eq" ucd="pos.eq.dec.meta.main" datatype="double" unit="degrees"><FIELD
-<DESCRIPTION> Declination in degrees (Equatorial J2000)</DESCRIPTION>
-<FIELD>
-<FIELD ID="main_col5" name="Object Type" ucd="src.class" datatype="char" arraysize="4">
-<DESCRIPTION>
NED's Preferred Object Type: G:GPair,GTpl,GGroup,GChar,QSO,AbL,S,Radius,JS,EmLS,IVES,Xny,S,N
-<DESCRIPTION>
+ <LINK><LINK>
-<FIELD ID="main_col6" name="Velocity" ucd="src.velocity" datatype="double" unit="km/sec"><FIELD>
-<FIELD ID="main_col7" name="Redshift" ucd="src.redshift" datatype="double"><FIELD>
+ <FIELD ID="main_col8" name="DistanceArcmin" ucd="pos.distance" datatype="double" unit="arcmin"><FIELD>
+ <FIELD ID="main_col9" name="Number of References" ucd="meta.bio.meta.number" datatype="int"><FIELD>
+ <FIELD ID="main_col10" name="Number of Notes" ucd="meta.note.meta.number" datatype="int"><FIELD>
+ <FIELD ID="main_col11" name="Number of Photometry Data Points" ucd="phot.meta.number" datatype="int"><FI
+ <FIELD ID="main_col12" name="Number of Position Data Points" ucd="pos.meta.number" datatype="int"><FIELD
+ <FIELD ID="main_col13" name="Number of Redshift Data Points" ucd="src.redshift.meta.number" datatype="int">4
+ <FIELD ID="main_col14" name="Number of Diameter Data Points" ucd="phys.size.diameter.meta.number" datatype
+ <FIELD ID="main_col15" name="Number of Associations" ucd="meta.id.assoc.meta.number" datatype="int"><FIE
-<DATA>
-<TABLEDATA>
-<TR>
<TD>1</TD>
<TD>IRAS F23574-6438</TD>
<TD>0.0141</TD>
<TD>-64.3612</TD>
<TD>GPair</TD>
<TD>
<TD>
<TD>0.0</TD>
<TD>0</TD>
</TR>
</TABLEDATA>
</VOTABLE>
```



Aitoff plot with VOTable



# New!

## Literature Data Content & Topical Keywords



- NED users (2003 user survey, Advisory Committee, others) asked for a way to filter the growing literature based on data content and specific extragalactic topics
- The technical literature on text search is filled with debates on the merits of free-text search versus use of a controlled vocabulary (e.g., [http://en.wikipedia.org/wiki/Controlled\\_vocabulary](http://en.wikipedia.org/wiki/Controlled_vocabulary))
- The latter often results in more precise results due to normalization of terminology (synonyms, etc.)
  - Examples: “starburst” = “H II” (context: nuclear spectral type); “ultraviolet” = “UV”
- NED is assigning and displaying two types of journal article keywords
  - Data Content Keywords (all papers)
  - Topical Keywords: currently pre-2000 only via ARIBIB (<http://www.ari.uni-heidelberg.de/aribib/>)
- Both keyword sets are displayed and utilized in new (optional) filters on NED literature searches based on object names and author names

Galaxies and Quasars	Galaxy Properties	Parts of Galaxies	Stellar Populations
Active Galactic Nuclei Active Galaxies Active Nuclei Arakelian Galaxies Barred Spirals BL Lacertae Objects Blazars Blue Compact Galaxies Blue Galaxies Bright Galaxies Central Galaxies Classification Coma Compact Galaxies Compact Groups Compact Objects Companions D Galaxies Disk Galaxies Double Galaxies	Absolute Magnitudes Absorption Systems Abundance Gradients Abundances Accretion Ages Angular Diameters Angular Momentum Antitruncation of Disks	Accretion Disk Accretion Disks Associations Black Holes Bow Shocks Bridges Broad-Line Regions Central Regions Cold Dust	Bright Giants Bright Stars Brown Dwarfs BY Draconis Stars Carbon Stars Cataclysmic Variables Central Stars Cepheids CH Stars

48. Title: OPTICAL SPECTRAL SIGNATURES OF DUSTY STARBURST GALAXIES  
 Author(s): POGGIANTI, B., WU, H.  
 Data Content Keywords: N/A  
 Topical Keywords: Starburst Galaxies, Interstellar Dust, Galaxy Evolution, Starbursts, Infrared C  
[2000ApJ...529..157P](#)

49. Title: IMAGING OF ULTRALUMINOUS INFRARED GALAXIES IN THE NEAR-ULTRAVIOLET  
 Author(s): SURACE, J., SANDERS, D.  
 Data Content Keywords: **Photometry, Images, Notes**  
 Topical Keywords: N/A  
[2000AJ...120..604S](#)

50. Title: THE HARD X-RAY EMISSION OF LUMINOUS INFRARED GALAXIES  
 Author(s): RISALITI, G., GILLI, R., MAIOLINO, R., SALVATI, M.  
 Data Content Keywords: **Notes**  
 Topical Keywords: X Rays, Active Galactic Nuclei, Starburst Galaxies, Infrared Galaxies  
[2000A&A...357..13R](#)

51. Title: THE UPDATED ZWICKY CATALOG (UZC)  
 Author(s): FALCO, E., KURTZ, M., GELLER, M., HUCHRA, J., PETERS, J., BERLIND, P., MINK, D., TOK  
 Data Content Keywords: **Positions, Spectroscopy/Redshift**  
 Topical Keywords: Catalogues, Galaxies, Redshifts  
[1999PASP..111..438F](#)

52. Title: DUST EMISSION FROM QUASARS AND QUASAR HOST GALAXIES  
 Author(s): ANDREANI, P., FRANCESCHINI, A., GRANATO, G.

**Data Content Keywords**

- *NED captures the data content of papers.* Using semi-automated procedures, we can therefore assign keywords to a small but important subset of categories: Galaxy Classifications, Diameters, Components, Images, Photometry, Kinematics, Detailed Object Notes, Positions, and Spectroscopy (redshift).
- Such information often cannot be inferred from titles and abstracts alone, but requires knowledge of the content of tables, figures, etc.

**Topical Keywords**

- Leverages decades of work prepared and published in the Astronomy & Astrophysics Abstracts (ARIBIB: 1964-2000)
- The ARIBIB activity (humans classifying paper content) ended in 2000
- Detailed classification of article content cannot be extracted from titles and abstracts alone, but requires analysis of the paper content



# New! NED Spectral Archive



Primary design goals are to provide:

1. A repository for spectra corresponding to rendered plots in journal articles, as submitted to NED by authors; also supports other available spectral archives
2. Preview plots for each spectrum
3. Preservation of the original data format submitted by authors and archive curators
4. Value-added standardized (MKS) units and a uniform VOTable data format
5. ASCII and VOTable download options
6. A query service to enable users to locate spectra by object name, journal article (refcode), passband, spectral lines, and combinations thereof
7. Quick-look visualization and analysis, facilitating fusion and comparison of spectra
8. VO Interoperability

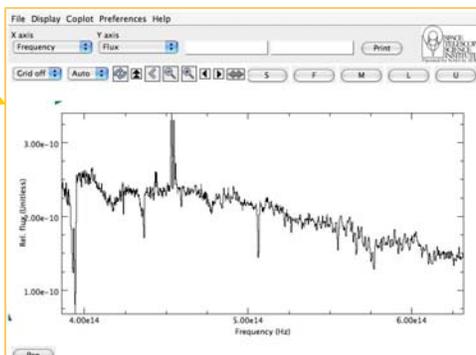
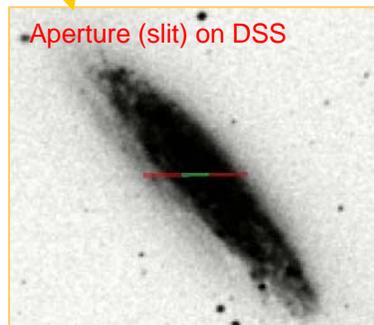
External Resource



Basic Metadata

Extensive Metadata

Aperture (slit) on DSS



Launch  
Specview (STScI)



# Database Contents



## As of January 2007 release:

- 14.7 million multi-wavelength source cross-identifications (3x increase since 2002)
- 9.5 million unique extragalactic objects (2.5x increase since 2002)
- 25.2 million photometric measurements spanning gamma-rays through radio wavelengths (with uncertainties) and dynamic SEDs (7x increase since 2002)
- 3.6 million detailed size measurements with uncertainties (None in 2002)
- 3.6 million object pointers to 65 thousand journal articles (2x increase since 2002)
- 1.3 million redshifts (7x increase since 2002)
- 2.3 million FITS images, maps and links with previews (18x increase since 2002)
- 65 thousand detailed notes from catalogs and other publications (40% increase since 2002)
- 42 thousand journal article abstracts (2x increase since 2002)

## Updates: New Objects in NED

- 103 thousand galaxies & 13 thousand QSOs with z's from SDSS DR5
- 4.8 thousand SDSS BAL QSOs from A Catalog of Broad Absorption Line Quasars from SDSS DR3 (2006ApJS..165....1T)
- 4.8 thousand Chandra sources in the NOAO Deep Wide-Field Survey field from 2006ApJ...641..140B
- 6.4 thousand galaxies around 11 clusters from the Las Campanas/Anglo-Australian Telescope Rich Cluster Survey (2006MNRAS.366..645P)
- 0.5-8 keV photometry for 950 objects from Chandra Deep Field North (2003AJ....126..539A)
- 70 & 160um photometry for 894 objects from Spitzer FLS (2006AJ....131..250F)
- 115 thousand objects in the Spitzer FLS and 5239 objects in the ELAIS-N1 fields from Spitzer IRAC images; detailed photometry at 3.6, 4.5, 5.8, and 8.0 microns, and positions from Lacy et al. (2005ApJS..161...41L)
- This is just a small sampling
- See NED release news and history for details
  - [http://nedwww.ipac.caltech.edu/help/whats\\_new.html](http://nedwww.ipac.caltech.edu/help/whats_new.html)
  - <http://nedwww.ipac.caltech.edu/help/nedhistory.html>

## Other NED Features

- A key NED activity is cross-identification and association of millions of entries in multi-wavelength survey catalogs and publications using a combination of computer software that utilizes positional uncertainty information to compute probability measures, followed by close inspection to resolve complex cases that cannot be fully automated.
- Galaxy attributes and data relationships are revised and augmented constantly to keep up with new survey data and knowledge appearing in the literature.
- Updates to the public database occur approximately every three months after periods of data entry, quality assurance, and testing using an internal development and test database.



## A Knowledgebase for Extragalactic Astronomy and Cosmology

- Available at <http://nedwww.ipac.caltech.edu/level5/>
- Hyperlinked review articles (e.g., ARA&A) and documents of current and lasting interest to cosmologists and extragalactic astronomers
- Contents include a glossary of terms, essays, recent research articles, detailed monographs and extensive reviews (where copyrights allow).
- Within each article
  - Cited extragalactic objects are cross-linked to NED Basic Data frames
  - Citations are hyperlinked to ADS
  - Tabular data, images and graphs are linked to and from relevant essays and review articles
- Total number of articles to date  $\longrightarrow$  630

## NEW ADDITIONS

- [FIRST LIGHT](#) - Abraham Loeb (2006)
- [UNDERSTANDING GALAXY FORMATION AND EVOLUTION](#) - Vladimir Avila-Reese (2006)
- [GAMMA-RAY BURSTS](#) - P. Mészáros (2006)
- [ADVANCED TOPICS IN COSMOLOGY: A PEDAGOGICAL INTRODUCTION](#) - T. Padmanabhan (2006)
- [DARK MATTER AND BACKGROUND LIGHT](#) - J.M. Overduin & P.S. Wesson (2004)
- [THE GALEX ULTRAVIOLET ATLAS OF NEARBY GALAXIES](#) - Armando Gil de Paz et al. (2006)
- [PHYSICS OF COSMIC REIONIZATION](#) - T. Roy Choudhury and A. Ferrara (2006)
- [NON-BARYONIC DARK MATTER](#) - Paolo Gondolo (2004)
- [HOT GAS IN AND AROUND ELLIPTICAL GALAXIES](#) - William G. Mathews & Fabrizio Brighenti (2003)
- [COSMOLOGY WITH THE SUNYAEV-ZEL'DOVICH EFFECT](#) - John E. Carlstrom et al. (2002)
- [THE COSMIC MICROWAVE BACKGROUND RADIATION](#) - Eric Gawiser and Joseph Silk (2000)
- [TYPE Ia SUPERNOVAE](#) - Bruno Leibundgut (2000)
- [GALAXY FORMATION](#) - Eric Gawiser (2005)
- [GALAXY COLLISIONS - DAWN OF A NEW ERA](#) - Curtis Struck (2005)

The Level 5 Glossary and Lexicon of Astronomical Terms received the Griffith Observatory Star Award in July 2003 for excellence in promoting astronomy to the public through the World Wide Web..



This document can be downloaded from

<http://nedwww.ipac.caltech.edu/help/NED2007JanHandout.pdf>