NED API specification

Last Change: May 26, 2026

The NED API is stateless, and follows RESTful principles. Responses are formatted in the IVOA VOTable format, as specified in VOTable 1.5. The structure of the VOTable is defined by its XML schema, available at VOTable-1.5.xsd. The API output includes query details, results metadata and data.

**** OverviewOfObject (the old byname) ****				
Service for the API	**OverviewOfObject**			
Purpose	Overview data for an object			
	Parameters	**Description**	**type**	**Examples**
Required	TARGET	the name of an object	string	• NGC 0451 • M31
Optional	HCONST OMEGAM OMEGAV	cosmological parameters: Defaults to HCONST=67.8, OMEGAM=0.308, OMEGAV=0.692	number	
Examples	• https://ned.ipac.caltech.edu/NED::API/OverviewOfObject?TARGET=m31			
	name	**description**	**type**	**unit**
Output fields	Cross-identifications	A subset of the cross-IDs for the object, in NED standard format	string	
	NED Notes	Note about the object, as transcribed from the referenced catalog or publication	string	
Coordinates for Fiducial Position	Lon (Equatorial J2000) in sexagesimal	Right Ascension in sexagesimal (FK5 Equatorial J2000.0)	string	
	Lat (Equatorial J2000) in sexagesimal	Declination in sexagesimal (FK5 Equatorial J2000.0)	string	
	Lon (Equatorial J2000)	Right Ascension in degrees (FK5 Equatorial J2000.0)	double	deg
	Lat (Equatorial J2000)	Declination in degrees (FK5 Equatorial J2000.0)	double	deg
	Semi-Major Unc	95 percent uncertainty ellipse in semi-major axis	double	arcsec
	Semi-Minor Unc	95 percent uncertainty ellipse in semi-minor axis	double	arcsec
	PA of Unc (Equatorial J2000)	Position angle of uncertainty ellipse (FK5 Equatorial J2000)	double	deg
Fiducial Redshift & Derived Quantities	Position Reference	Bibliographic reference code	string	
	Lon (Galactic)	Longitude in decimal degrees (Galactic)	double	deg
	Lat (Galactic)	Latitude in degrees (Galactic)	double	deg
	Redshift	Heliocentric redshift	double	
	Redshift Unc	Uncertainty for heliocentric redshift	double	
	v (Heliocentric)	The heliocentric radial velocity	double	km/s
	v Unc (Heliocentric)	The uncertainty on the Heliocentric radial velocity	double	km/s
	Redshift Refcode	Bibliographic reference code	string	

Redshift-independent Distances	v (3K CMB)	Radial velocity, derived from the heliocentric redshift, in the Cosmic Microwave Background reference frame	double	km/s
	v Unc (3K CMB)	The uncertainty on the radial velocity in the Cosmic Microwave Background reference frame	double	km/s
	D (3K CMB)	Hubble Flow Distance, calculated from the apparent velocity corrected for the Cosmic Microwave Background velocity with assumed Hubble constant	double	Mpc
	D Unc (3K CMB)	The uncertainty for Hubble Flow Distance, calculated from the apparent velocity corrected for the Cosmic Microwave Background velocity	double	Mpc
Classifications	Mean Distance	Mean of the Distance in megaparsecs	double	Mpc
	SEM Distance	Standard Error of the Mean of the Distance in megaparsecs	double	Mpc
	~~Object Type~~	~~Object Type: G, Gpair, GTrpl, CCroup, QSO, AbLS, etc.~~	~~string~~	
	EM Region	Region of the electromagnetic spectrum where the object was detected, Vis, Radio, IR UV, XRay, Gamma, etc.	char	
	Physical Type	Physical type of the celestial object: G, Gpair, GTrpl, GGroup, QSO, AbLS, etc.	char	
	Morphology	Optical Morphological Classifications	string	
Quick-look Angular & Physical Diameters	Morphology Refcode	Bibliographic reference code	string	
	Activity Type	Spectral, Active Galactic Nuclei, and Starburst Activity Types	string	
	Activity Refcode	Bibliographic reference code	string	
	Other	Other Object Info	string	
	Bandpass	Bandpass of diameter	string	
	Major Axis	Major axis diameter (2*a)	double	arcsec
Foreground Galactic Extinction	Diameter Refcode	Bibliographic reference code	string	
	Physical Major Axis	Physical Major Axis	double	kpc
	Galactic Extinction (Landolt V)	Foreground Galactic extinction at the coordinates of the named object in Landolt V band	double	mag
	Galactic Extinction (UKIRT K)	Foreground Galactic extinction at the coordinates of the named object in UKIRT K band	double	mag
	Overview Footnote	Note about the distance used to compute derived quantities. This is different for every object.	string	

****** Cone Search ******

Service for the API	**ConeSearchByTarget**			
Purpose	Search for objects near a the input target (object) name			
	Parameters	**Description**	**type**	**Examples**
Required	TARGET	the name of an object	string	• NGC 0451 • M31
Optional	MAXREC*	Maximum number of records to return	int	
	Radius (SR)	Search radius in units of arcminutes. Defaults to 1 arcminute if no RADIUS is specified. RADIUS = 0 means only the named target object is returned from the search.	number	• 0 • 1.5

	<Redshift Constraints> Z_CONSTRAINT Z_VALUE1 Z_VALUE2 Z_UNIT	Redshift constraints: Z_CONSTRAINT: constraint type options are [Unconstrained|Available|Unavailable|LargerThan|LessThan |Between], defaults to 'Unconstrained' Z_VALUE1: bound for 'LargerThan' and 'LessThan' or lower bound for 'Between' Z_VALUE2: upper bound for 'Between', where Z_VALUE2 is no less than Z_VALUE1. Z_UNIT: unit for z values , options are [z|km/s], defaults to 'z' if not specified.	Z_CONSTRAINT: string Z_VALUE1, Z_VALUE2: number Z_UNIT: string	• for objects with redshift (z) available, Z_CONSTRAINT= Available • for object with redshift larger than a number, e.g. 1.4e-05 Z_CONSTRAINT=LargerThan Z_VALUE1 =1.4e-0.5 • for objects with redshift between two redshifts, e.g. 4.2 and 96 km/s. Z_CONSTRAINT=BETWEEN Z_VALUE1=4.2 Z_VALUE2=96 Z_UNIT=km/s

Examples

- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31 (use default search radius of 1 arc minute)
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&RADIUS=1
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&RADIUS=1&MAXREC=2
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&RADIUS=0 (return data for only the named target object)
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&RADIUS=1&MAXREC=0 (return only field metadata)
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&z_constraint=LargerThan&z_value1=1.4e-05&RADIUS=1.0
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&z_constraint=LessThan&z_value1=0.00032&RADIUS=1.0
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&z_constraint=Between&z_value1=1.4e-05&z_value2=0.00032&RADIUS=1.0
- https://ned.ipac.caltech.edu/NED::API/ConeSearchByTarget?TARGET=m31&z_constraint=Between&z_value1=4.2&z_value2=96&RADIUS=1.0&z_unit=km/s (specify units in km/s)

	name	description	type	unit
Output fields	No.	A row number applicable to this list only	int	
	Object Name	Object name in NED standard format	string	
	RA-s	Right Ascension in sexagesimal (FK5 Equatorial J2000.0)	string	
	Dec-s	Declination in sexagesimal (FK5 Equatorial J2000.0)	string	
	RA	Right Ascension in degrees (FK5 Equatorial J2000.0)	double	deg
	Dec	Declination in degrees (FK5 Equatorial J2000.0)	double	deg
	Redshift (z)	Fiducial heliocentric redshift	double	
	cz	Apparent velocity computed as c*z	double	km/s
	z flag	Redshift flags indicating measurement technique (1 char, e.g., S=spec, P=phot), method (2 chars, e.g., SL=single line), and quality (1 char, e.g. blank= reliable, ? =uncertain).	string	
	Phys Type	Physical type of the celestial object	char	
	EM Region	Region of the electromagnetic spectrum where the object was detected	char	
	Separation	Angular separation between object and search center	double	arcmin
	Reference	Number of references	int	
	Note	Number of notes	int	
	Photometry	Number of photometric data points	int	
	Position	Number of position data points	int	
	Redshift	Number of redshift data points	int	
	Diameter	Number of diameter data points	int	
	Distances	Number of redshift independent distances	int	
	Classification	Number of classifications	int	
	Images	Number of images	int	
	Spectra	Number of spectra	int	

Service for the API	**ConeSearchByPosition**			
Purpose	Search for objects near an input position			
	Parameters	**Description**	**type**	**Examples**

Required	LON (RA), LAT (DEC)	Coordinate specified as LON/LAT (longitude/latitude) or RA/Dec (right ascension/declination) RA, DEC are alternate keys defined by IVOA Simple Cone Search.	number or string	LON: • hour unit, 1.036h or 1.036 (CSYS is Equatorial) • degree unit, 15.54d or 15.54 (CSYS is not Equatorial) • sexagesimal, 01h02m10.23s LAT: • degree unit, 44.32d or 44.32 • sexagesimal, 44d19m12s
Optional	MAXREC*	Maximum number of records to return.	int	
	RADIUS (SR)	Search radius in units of arcminutes. Defaults to 1 arcmin if no RADIUS is specified. SR is alternate key defined by IVOA Simple Cone Search.	number	1.5
	CSYS	Coordinate system. Options are [Equatorial | Ecliptic | Galactic | SuperGalactic]. Defaults to 'Equatorial' if not specified.	string	• CSYS: Equatorial,EQUINOX: J2000 or CSYS: Equatorial • CSYS: Ecliptic, EQUINOX: B1950 • CSYS: Galactic • CSYS: SuperGalactic
	EQUINOX	Equinox of coordinate system. Options are [J2000[.0] | B1950[.0]]. Required if the coordinate system is Equatorial or Ecliptic and defaults to J2000.0 if not specified.	string	
	<Redshift Constraint> Same options as ConeSearchByTarget			
Examples	• https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?LON=10.684793d&LAT=41.269065&CSYS=Equatorial&EQUINOX=J2000.0&RADIUS=1&MAXREC=2 • https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?RA=10.684793d&DEC=41.269065&CSYS=Equatorial&EQUINOX=J2000.0&SR=1&MAXREC=2 • https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?LON=10.684793d&LAT=41.269065&CSYS=Equatorial&EQUINOX=J2000.0&RADIUS=0 (An error results from invalid input. RADIUS(SR) must be > 0.) • https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?LON=10.684799d&LAT=41.269076d • https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?LON=10.684799d&LAT=41.269076d&Z_CONSTRAINT=Unavailable • https://ned.ipac.caltech.edu/NED::API/ConeSearchByPosition?LON=10.684799d&LAT=41.269076d&Z_CONSTRAINT=Available			
Output fields	same as ConeSearchByTarget.			
Service for the API	**ConeSearchByIAUstyle**			
Purpose	Search objects in IAU style in the equatorial coordinate system.			
	Parameters	**Description**	**type**	**Examples**
Required	IAU_NAME	IAU style name. For more information, see the NED Searches page. The search is made using a computed radius and position based on the precision of the input string in sexagesimal format in Equatorial system. IAU formats: • HHh+DD (e.g., 096+69) • HHMM+DD (e.g., 0955+69) • HHMM+DDd (e.g., 0955+696) • HHMMm+DDd (e.g., 09558+696) • HHMMm+DDMM (e.g., 09558+6940) • HHMMSS+DDMMm (e.g., 095552+69407) Please refer to the API output of the examples, which includes the radius and the position based on the given IAU_NAME for the search.	string	• 0955+69 • 0955+696 • 09558+696 • 09558+6940 • 095552+69407
Optional	MAXREC*	Maximum number of records to return.	int	

	EQUINOX	Equinox for Equatorial coordinate system. Defaults to B1950.	string	• J2000 • B1950
	<Redshift Constraint> Same options as ConeSearchByTarget			
Examples	• https://ned.ipac.caltech.edu/NED::API/ConeSearchByIAUstyle?IAU_NAME=05771%2B05771 • https://ned.ipac.caltech.edu/NED::API/ConeSearchByIAUstyle?IAU_NAME=05771%2B05771&CSYS=Equatorial&EQUINOX=J2000 • https://ned.ipac.caltech.edu/NED::API/ConeSearchByIAUstyle?IAU_NAME=05771%2B05771&Z_CONSTRAINT=Unavailable&MAXREC=2			
Output fields	same as ConeSearchByTarget.			
****** Search Objects in Refcode ******				
Service for the API	**ObjectsInRefcode**			
Purpose	Search objects in Refcode			
	Parameters	**Description**	**type**	**Examples**
Required	REFCODE (BIBCODE)	19-digit reference code of an article	string	• 1997A&A...323...31K • 1986AJ.....91..312S
Optional	MAXREC*	Maximum number of records to return	int	10
Examples	• https://ned.ipac.caltech.edu/NED::API/ObjectsInRefcode?refcode=2024ApJ...964..117S&MAXREC=2 • https://ned.ipac.caltech.edu/NED::API/ObjectsInRefcode?refcode=2024ApJ...964..117S • https://ned.ipac.caltech.edu/NED::API/ObjectsInRefcode?refcode=2024ApJ...964..117S&MAXREC=0 • https://ned.ipac.caltech.edu/NED::API/ObjectsInRefcode?refcode=2013ApJS..206....4K&MAXREC=2000 • https://ned.ipac.caltech.edu/NED::API/ObjectsInRefcode?refcode=2013ApJS..206....4K (the result is truncated to 100,000 from more than 100,000 available)			
Output fields	same as ConeSearchByTarget with no 'Separation' field.			
****** Byname Search ******				
Service for the API	**CrossidsOfObject** **PositionsOfObject** **RedshiftsOfObject** **DistancesOfObject** **ClassificationsOfObject** **ExtinctionAtTarget** **NotesOfObject** **DiametersOfObject** **PhotometryOfObject** **ReferencesOfObject** **ExternalLinksOfObject**			
Purpose	Retrieve crossids, positions, redshifts, distances, classifications, extinction, notes, diameters, photometry, references or external links for a named target object			
	Parameters	**Description**	**type**	**Examples**
Required	TARGET	the name of an object	string	• NGC 0451 • M31
Optional	MAXREC*	Maximum records to return.	int	

	SPECLINES	For PhotometryOfObject only. A flag to select spectral line fluxes rather than broadband photometry measurements for the specified object. Options are [no | yes], defaults to 'no' if not specified. If 'yes', flux measurements for spectral lines are returned if available; if 'no' broadband (continuum) flux measurements are returned if available	string	yes no

Examples

- https://ned.ipac.caltech.edu/NED::API/CrossidsOfObject?TARGET=MESSIER+031 (Return all available cross-IDs for the named target object.)
- https://ned.ipac.caltech.edu/NED::API/CrossidsOfObject?TARGET=MESSIER+031&MAXREC=10 ((Limit the output to a maximum of 10 records.)
- https://ned.ipac.caltech.edu/NED::API/PositionsOfObject?TARGET=MESSIER+031 (The following queries use the same input parameters as CrossidsOfObject.)
- https://ned.ipac.caltech.edu/NED::API/PositionsOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/RedshiftsOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/RedshiftsOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/DistancesOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/DistancesOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/ClassificationsOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/ClassificationsOfObject?TARGET=MESSIER+31&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/NotesOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/NotesOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/DiametersOfObject?TARGET=m31
- https://ned.ipac.caltech.edu/NED::API/DiametersOfObject?TARGET=m31&MAXREC=2
- https://ned.ipac.caltech.edu/NED::API/PhotometryOfObject?TARGET=MESSIER+031 (Return broadband photometry, the spectral energy distribution, for the named target object.)
- https://ned.ipac.caltech.edu/NED::API/PhotometryOfObject?TARGET=MESSIER+031&SPECLINES=yes (Return spectral line flux measurements for the named target object.)
- https://ned.ipac.caltech.edu/NED::API/ReferencesOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/ReferencesOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/ExternalLinksOfObject?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/ExternalLinksOfObject?TARGET=MESSIER+031&MAXREC=10
- https://ned.ipac.caltech.edu/NED::API/ExtinctionAtTarget?TARGET=MESSIER+031
- https://ned.ipac.caltech.edu/NED::API/ExtinctionAtTarget?TARGET=MESSIER+031&MAXREC=10

Output fields	name	description	type	unit
CrossidsOfObject	No.	A row number applicable to this list only	int	
	Object Name	Object name in NED standard format	string	
	Physical Type	Physical type of the celestial object	string	
	EM Region	Region of the electromagnetic spectrum where the object was detected	string	
PositionsOfObject	No.	A row number applicable to this list only	int	
	RA-s	Right Ascension in sexagesimal (FK5 Equatorial J2000.0)	string	
	Dec-s	Declination in sexagesimal (FK5 Equatorial J2000.0)	string	
	RA	Right Ascension in degrees (FK5 Equatorial J2000.0)	double	deg
	Dec	Declination in degrees (FK5 Equatorial J2000.0)	double	deg
	Semi-Maj Unc	95 percent uncertainty ellipse in semi-major axis	double	arcsec
	Semi-Min Unc	95 percent uncertainty ellipse in semi-minor axis	double	arcsec
	PA of unc	Position angle of uncertainty ellipse (FK5 Equatorial J2000)	double	deg
	Reference	Bibliographic reference code	string	
	Fiducial	A feature to identify data representing the fiducial measurement	boolean	
RedshiftsOfObject	No.	A row number applicable to this list only	int	
	Redshift (z)	Heliocentric redshift	double	
	Redshift(z) Unc	Uncertainty for heliocentric redshift	double	
	cz (Velocity)	Apparent velocity computed as c*z	double	km/s
	cz Unc	Uncertainty for apparent velocity computed as c*z	double	km/s
	Technique	Technique used to obtain redshift, see https://ned.ipac.caltech.edu/Documents/Guides/Database	string	
	Method	Method used in obtaining redshift, see https://ned.ipac.caltech.edu/Documents/Guides/Database	string	
	Quality Flag	Quality of redshift indicated by author, value "?" means uncertain	string	
	Bandpass	Bandpass at which the data were measured	string	
	Reference	Bibliographic reference code	string	

	Fiducial	A feature to identify data representing the fiducial measurement	boolean	
DistancesOfObject	No.	A row number applicable to this list only	int	
	(m-M)	Distance modulus in magnitudes (m-M)	double	mag
	err(m-M)	Error in the distance modulus, if given, in magnitudes	double	mag
	Distance	Distance in megaparsecs	double	Mpc
	Method	Method used to determine the distance	string	
	Reference	Bibliographic reference code	string	
	Notes	Notes and qualifiers	string	
	SN Name	The supernova name, if the distance depends on one of the SNe methods	string	
	Redshift	Redshift of the object or host galaxy, if used to convert a luminosity distance modulus to metric distance	double	
	H0	Adopted Hubble constant, otherwise set 70.0 km/s/Mpc	double	km/s/Mpc
	LMCModulus	Adopted LMC distance modulus, otherwise (m-M) = 18.50	double	mag
ClassificationsOfObject	No.	A row number applicable to this list only	int	
	Domain of Classification	Domain of Classification: Galaxy Morphology, Radio Morphology, Distance Indicator, Kinematics, Activity Type, Luminosity Class, and Hierarchy	string	
	Published Classification	Published Classification	string	
	Reference	Bibliographic reference code	string	
	NED Homogenized Classification	NED Homogenized Classification	string	
	NED Homogenized Classification Flag	NED Homogenized Classification Flag	string	
	Bandpass	Bandpass of Classification	string	
	Region of Classification	The spatial region to which the classification applies	string	
	Notes	Notes and qualifiers	string	
ExtinctionAtTarget	No.	A row number applicable to this list only	int	
	Bandpass	Bandpass at which extinction is calculated	string	
	Central Wavelength	Throughput weighted wavelength in the bandpass	double	um
	Galactic Extinction	Foreground Galactic extinction at the coordinates	double	mag
	Reference	Bibliographic reference code	string	
NotesOfObject	No.	A row number applicable to this list only	int	
	Reference	Bibliographic reference code	string	
	Object Name	Object name in NED standard format	string	
	Note	Note about the object, as transcribed from the referenced catalog or publication	string	
DiametersOfObject	No.	A row number applicable to this list only	int	
	Bandpass	Bandpass at which the data were measured	string	
	Major Axis	Major axis diameter (2*a)	double	arcsec
	Major Axis Unc	Major axis diameter uncertainty	double	arcsec
	Minor Axis	Minor axis diameter (2*b)	double	arcsec
	Minor Axis Unc	Minor axis diameter uncertainty	double	arcsec
	PA	Major axis position angle, in degrees east of north (FK5 Equatorial J2000)	double	deg
	Unc of PA	Major axis position angle uncertainty	double	deg

	Axis Ratio (b/a)	Ratio of minor axis over major axis	double	
	Diameter Type	Type of diameter or part of the object measured, e.g., Isophotal, half-light, FWHM	string	
	Reference Level	Reference level for the measured diameter(s), with units	string	
	Reference	Bibliographic reference code	string	
	Comments	Note about the object, as transcribed from the referenced catalog or publication	string	
PhotometryOfObject	No.	A row number applicable to this list only	int	
	Bandpass	Bandpass at which the data were measured	string	
	Measurement	Photometry value as published and interpreted by NED team	double	
	Line Type	Spectral line type as published and interpreted by NED team (emission, absorption, both)	string	
	Unc High	Photometry upper uncertainty as published and interpreted by NED team	double	
	Unc Low	Photometry lower uncertainty as published and interpreted by NED team	double	
	Unit	Photometry unit as published and interpreted by NED team	string	
	Frequency (Hz)	Frequency value as standardized by NED	double	Hz
	Flux Density	Flux density value as standardized by NED	double	Jy
	FD Unc High	Upper uncertainty of flux density as standardized by NED	double	Jy
	FD Unc Low	Lower uncertainty of flux density as standardized by NED	double	Jy
	FD Upper Limit	Upper limit of flux density as standardized by NED	double	Jy
	FD Lower Limit	Lower limit of flux density as standardized by NED	double	Jy
	Flux	Flux value as standardized by NED	double	Jy•Hz
	F Unc High	Upper uncertainty of flux as standardized by NED	double	Jy•Hz
	F Unc Low	Lower uncertainty of flux as standardized by NED	double	Jy•Hz
	F Upper Limit	Upper limit of flux as standardized by NED	double	Jy•Hz
	F Lower Limit	Lower limit of flux as standardized by NED	double	Jy•Hz
	Telescope	Telescope as published and interpreted by NED team	string	
	Instrument	Instrument as published and interpreted by NED team	string	
	Frequency	Frequency value as published and interpreted by NED team	double	
	Freq. Unit	Frequency unit as published and interpreted by NED team	string	
	Aperture Type	Aperture Type as published and interpreted by NED team (e.g. flux in fixed aperture, total flux)	string	
	Reference	Bibliographic reference code	string	
ReferencesOfObject	No.	A row number applicable to this list only	int	
	Reference	Bibliographic reference code	string	
	Author List	Author List	string	
	Article Title	Article Title	string	
ExternalLinksOfObject	No.	A row number applicable to this list only	int	
	Resource URL	External resource display label	string	
	External Resource Link	External resource url	string	
****** Calculation tools ******				
Service for the API	**ExtinctionsAtPosition**			
Purpose	Look up the foreground Galactic extinction at the input position			

	Parameters	Description	type	Examples
Required	LON, LAT	Longitude and latitude.	number or string	LON: • hour unit, 1.036h or 1.036 (CSYS is Equatorial) • degree unit, 15.54d or 15.54 (CSYS is not Equatorial) • sexagesimal, 01h02m10.23s LAT: • degree unit, 44.32d or 44.32 • sexagesimal, 44d19m12s
Optional	MAXREC*	Maximum records to return.	int	
	CSYS	Coordinate system for the input LON and LAT values. Options: [Equatorial, Galactic, SuperGalactic, Ecliptic]. Defaults to 'Galactic'.	string	• CSYS: Equatorial, EQUINOX: J2000, EPOCH: 2000.0 or CSYS: Equatorial • CSYS: Ecliptic, EQUINOX: B1950 • CSYS: Galactic • CSYS: SuperGalactic
	EQUINOX	Equinox of coordinate system. Options: [J2000[.0] | B1950[.0]]. Required if the coordinate system is Equatorial or Ecliptic.	string	
	EPOCH	Observation epoch. If this parameter is not included in the query, the NED service will internally default the epoch to 2000.0 (or 1950.0) when EQUINOX is J2000.0 (or B1950.0) and CSYS is Equatorial or Ecliptic; otherwise, it will default to 1950.	number	
Examples	• https://ned.ipac.caltech.edu/NED::API/ExtinctionAtPosition?csys=Equatorial&equinox=J2000.0&lon=10.68479292d&lat=41.269065d • https://ned.ipac.caltech.edu/NED::API/ExtinctionAtPosition?csys=Equatorial&equinox=B1950.0&lon=10.68479292d&lat=41.269065d • https://ned.ipac.caltech.edu/NED::API/ExtinctionAtPosition?lon=10.68479292&lat=41.269065 • https://ned.ipac.caltech.edu/NED::API/ExtinctionAtPosition?csys=Equatorial&equinox=J2000.0&epoch=2000.0&lon=10.68479292d&lat=41.269065d&MAXREC=2			
Output fields	same as ExtinctionsOfObject			
Service for the API	**CoordinateConversion**			
Purpose	Convert coordinates from one system to another.			
	Parameters	**Description**	**type**	**Examples**
Required	LON, LAT	Longitude and latitude.	number or string~	LON: • hour unit, 1.036 or 1.036 h (CSYS is Equatorial) • degree unit, 15.54d or 15.54 (CSYS is not Equatorial) • sexagesimal, 01h02m10.23s LAT: • degree unit, 44.32d or 44.32 • sexagesimal, 44d19m12s
	OUT_CSYS	Coordinate system for the output values. Options: [Equatorial, Galactic, SuperGalactic, Ecliptic]	string	
Optional	IN_CSYS	Coordinate system for the input LON and LAT values. Options: [Equatorial, Galactic, SuperGalactic, Ecliptic] Defaults to Equatorial.	string	• IN_CSYS: Equatorial, IN_EQUINOX: J2000, OBS_EPOCH: 2000.0 or IN_CSYS: Equatorial • IN_CSYS: Ecliptic, IN_EQUINOX: B1950 • IN_CSYS: Galactic • IN_CSYS: SuperGalactic

	IN_EQUINOX	Equinox of input coordinate system. Options: [J2000[.0] | B1950[.0]] Required if the input coordinate system is Equatorial or Ecliptic and defaults to J2000.0 if not specified.	string	
	OBS_EPOCH	Observation epoch. If this parameter is not included in the query, the NED service will internally default the epoch to 2000.0 (or 1950.0) when EQUINOX is J2000.0 (or B1950.0) and CSYS is Equatorial or Ecliptic; otherwise, it will default to 1950.	number	
	PA	Position angle (degrees, east of north), defaults to 0.0 degree.	number	
	OUTPUT_EQUINOX	Equinox of output coordinate system. Options: [J2000[.0] | B1950[.0]] Required if the output coordinate system is Equatorial or Ecliptic and defaults to J2000.0 if not specified.	string	
Examples	• https://ned.ipac.caltech.edu/NED::API/CoordinateConversion?in_csys=Galactic&lon=1h2m4s&lat=1d2m4&pa=28.1&out_csys=Supergalactic • https://ned.ipac.caltech.edu/NED::API/CoordinateConversion?in_csys=Equatorial&in_equinox=J2000.0&obs_epoch=2000.0&pa=0.0&out_csys=Ecliptic&out_equinox=B1950.0&lon=00h42m44.3503s&lat=%2B41d16m08.634s • https://ned.ipac.caltech.edu/NED::API/CoordinateConversion?in_csys=Equatorial&IN_EQUINOX=B1950.0&lon=1h2m4s&lat=1d2m4&pa=28.1&out_csys=Supergalactic • https://ned.ipac.caltech.edu/NED::API/CoordinateConversion?out_csys=Ecliptic&out_equinox=B1950.0&lon=00h42m44.3503s&lat=%2B41d16m08.634s			
	Parameters	**Description**	**type**	**unit**
Output fields	Input System	Input Coordinate System	string	
	Input Equinox	Input Equinox	string	
	Input Observation Epoch	Input Observation Epoch	double	yr
	Input Longitude	Input Longitude	double	deg
	Input Latitude	Input Latitude	double	deg
	Input PA	Input Position Angle	double	deg
	Input Longitude Sexagesimal	Input Longitude in Sexagesimal	string	
	Input Latitude Sexagesimal	Input Latitude in Sexagesimal	string	
	Output System	Output Coordinate System	string	
	Output Equinox	Output Equinox	string	
	Output Longitude	Output Longitude	double	deg
	Output Latitude	Output Latitude	double	deg
	Output PA	Output Position Angle	double	deg
	Output Longitude Sexagesimal	Output Longitude in Sexagesimal	string	
	Output Latitude Sexagesimal	Output Latitude in Sexagesimal	string	
Service for the API	**VelocityConversion**			
Purpose	Velocity conversion between different reference frames.			
	Parameters	**Description**	**type**	**Examples**

Required	LON, LAT	Coordinates of the object that you want to convert velocity (redshift) reference frame for. The coordinate system and epoch for the input longitude and latitude are defined by options IN_CSYS and IN_EQUINOX; if unspecified these default to Equatorial J2000.	number or string	LON: • hour unit, 1.036 or 1.036 h (CSYS is Equatorial) • degree unit, 15.54d or 15.54 (CSYS is not Equatorial) • sexagesimal, 01h02m10.23s LAT: • degree unit, 44.32d or 44.32 • sexagesimal, 44d19m12s
	VEL	Velocity in unit km/sec.	number	0.0
Optional	IN_CSYS	Coordinate system for the input LON and LAT values. Options: [Equatorial, Galactic, SuperGalactic] Defaults to Equatorial.	string	• IN_CSYS: Equatorial, IN_EQUINOX: J2000 or IN_CSYS: Equatorial • IN_CSYS: Ecliptic, IN_EQUINOX: B1950 • IN_CSYS: Galactic • IN_CSYS: SuperGalactic
	IN_EQUINOX	Equinox of input coordinate system. Required if the input coordinate system is Equatorial and defaults to J2000.0 if not specified.	string	
	VFROM	From reference frame, [Heliocentric| GSR | Local Group | 3K]. Defaults to Heliocentric if not specified.	string	
	VTO	To reference frame, [Heliocentric| GSR | Local Group | 3K]. Defaults to GSR if not specified.	string	
	USER_DEFINED	User defined apex vector. Options are [no | yes], defaults to 'no'.	string	
	A_CSYS A_EQUINOX ALON, ALAT, AVEL	Apex vector, Required if USER_DEFINED is 'yes', including A_CSYS: coordinate system A_EQUINOX: equinox of coordinate ALON, ALAT: logitude and latitude AVEL: velocity in unit km/sec	A_CSYS: string A_EQUINOX: string ALON, ALAT: string or number~ AVEL: number	
Examples	• https://ned.ipac.caltech.edu/NED::API/VelocityConversion?in_csys=SuperGalactic&lon=1&lat=1&vel=1000&vfrom=Heliocentric&vto=3K&user_defined=no • https://ned.ipac.caltech.edu/NED::API/VelocityConversion?in_csys=Equatorial&in_equinox=J2000.0&lon=01h02m10.23s&lat=%2B69d40m46s&vel=0.0&vfrom=Heliocentric&user_defined=yes&a_csys=Equatorial&a_equinox=J2000.0&alon=110d&alat=12d&avel=0.0			

	Parameters	**Description**	**type**	**unit**
Output fields	Input System	Input Coordinate System	string	
	Input Equinox	Input Equinox	string	
	Input Longitude	Input Longitude	double	deg
	Input Latitude	Input Latitude	double	deg
	Input Velocity	Input Velocity	double	km/s
	Input Longitude Sexagesimal	Input Longitude in Sexagesimal	string	
	Input Latitude Sexagesimal	Input Latitude in Sexagesimal	string	

	From Reference Frame	From Reference Frame	string	
	To Reference Frame	To Reference Frame	string	
	apex System	apex vector Coordinate System	string	
	apex Equinox	apex vector Equinox	string	
	apex Longitude	apex vector Longitude	double	deg
	apex Latitude	apex vector Latitude	double	deg
	apex Velocity	apex vector Velocity	double	km/s
	Output Velocity	Output Velocity	double	km/s
Footnotes:	*: If no MAXREC is specified, all data will be returned or subject to the resource limit defined by the service. For service ObjectsInRefcode, the limit is 100,000. If MAXREC is 0, only field definitions of the table are returned.			