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**NEW CATALOGUE OF SUSPECTED VARIABLE STARS.
THE REVISION VERSION.**

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<http://www.sai.msu.su/gcvs/gcvs/nsv2/>

INTRODUCTION

New Catalogue of Suspected Variable Stars (NSV) is a compilation of 14812 stars suspected of variability and not finally designated as variables prior to 1980. It is the successor to the "Catalogues of Stars Suspected of Variability" published in 1951 and 1965 (Kukarkin et al., 1951, 1965). Data contained in the new printed catalogue (Kukarkin et al., 1982) include positions, magnitudes, variability types, alternate designations, and references to the literature, as well as wide remarks.

The computer version of the NSV (created in 1988) contains principally the same data as in the printed catalogue, but only the data table without the textual material (bibliography, remarks) is included. References list and remarks text were added later. Necessary corrections were introduced every year since 1997, and coordinates were improved, compared to the printed version, for about half of the stars in the catalogue. Since 2010, we have started preparation of a new electronic version of NSV catalogue, which will contain improved coordinates J2000 and other improved data. Here we present NSV Release 2, a revised electronic version of NSV catalogue (Kukarkin et al., 1982).

DESCRIPTION

File Summary:

FileName	Explanations
nsv2.txt	The NSV Catalog
ref.txt	References
rem.txt	Remarks

Byte-by-byte Description of file: nsv2.txt

Bytes	Format	Units	Label	Explanations	
1-	5	I5	---	NSV	NSV number
	7	A1	---	NoteFlag	*[*] Remarks
9-	10	I2	h	RAh	Hours RA, equinox 2000.0
11-	12	I2	min	RAm	Minutes RA, equinox 2000.0
13-	17	F5.2	s	RA s	Seconds RA, equinox 2000.0

19	A1	---	DE-	Sign Dec, equinox 2000.0
20- 21	I2	deg	DEd	Degrees Dec, equinox 2000.0
22- 23	I2	arcmin	DEm	Minutes Dec, equinox 2000.0
24- 27	F4.1	arcsec	DEs	Seconds Dec, equinox 2000.0
28	A1	---	u_DEs	*[*:] position accuracy flag
30- 35	F6.3	arcsec/yr	PMa	Proper motion RA
37- 42	F6.3	arcsec/yr	PMd	Proper motion DE
44- 51	F8.3	yr	Epoch coor	*Epoch of the coordinates
53- 62	A10	---	Ident	*The source of astrometric data
64- 69	A6	---	VarType	Type of variability
71	A1	---	u_NSV	[-*]A flag "-" of doubt if a star's variability seems doubtful or erroneous to the catalog compilers
73	A1	---	l_magMax	[>]if magMax is a faint limit
74- 78	F5.2	mag	magMax	Magnitude at maximum brightness
79	A1	---	u_magMax	[:]Uncertainty flag on magMax
81- 82	A2	---	l_magMin	[<(<)"<" if magMin is a bright limit; "(" if magMinI is an amplitude
83- 88	F6.3	mag	magMin	Minimum magnitude or amplitude
89- 90	A2	---	u_magMin	[st:] "st" if light amplitude is reported for the minimum and it is given in steps
91	A1	---	f_magMin	[)] "]" if magMin is an amplitude
93- 94	A2	---	magCode	*The photometric system for magnitudes
96- 99	A4	---	Ref1	*Reference to a study of the star
101-104	A4	---	Ref2	*Chart reference
106-119	A14	---	Desig	*Designation in paper Ref1
121-133	A13	---	SpType	*Spectral type
135-146	A12	---	VarName	*Designation in GCVS

Note on NoteFlag1:

An asterisk in this field means the presence of a remark in the file "rem.txt".

There are several data fields that can contain asterisks. These signify that more complete information will be found in the remarks to the published catalog. The remarks contain much supplemental information. There, one will find information covering situations like, e.g.:

1. The discoverer of the light variability is not the author of the paper cited in the variability reference, or is one of several authors of the paper cited. In these cases, discoverers' names are given, in original transcriptions, in the remarks.

2. The most important additional information about a star, although the NSV compilers did not intend to present complete bibliographies for any cataloged stars.

3. Remarks for visual binaries giving visual magnitudes for the individual components A and B, angular separations, and position angles for faint components (or semimajor axis of a relative orbit and period of orbital motion). Data for other components are then given where applicable. (Combined magnitudes are generally reported in the Table.)

Designations of components of double/multiple stars: A,B,C ...; a,b,c ...; 1,2,3 ...; the symbols p = preceding, f = following, N = northern, S = southern, E = eastern, W = western may also appear.

If specific component no indicated, then coordinates in the Table refer to the primary component.

Note on u_DEs:

(:)a flag indicating that the coordinates are actually rougher than the accuracy standard adopted in this table.

(*)a flag indicating that the position in the discovery paper has no actual stars of brightness claimed in the publication.

Note on Epoch coor:

Epoch of the given coordinates. No epoch is provided when using the coordinates from the literature if the epoch was not specified in the publication and could not be established.

Note on Ident:

A brief designation of the source of astrometric data. In several cases, the catalog designation is followed by the symbol "+pm"; it implies that the position for a certain epoch was taken from the catalog and reduced to the epoch 2000.0 using information on the star's proper motion from a different source.

Below, we give a list of the major catalogs and other data sources.

Note on VarType:

The system of variable star classification corresponds to the GCVS4 (<http://www.sai.msu.su/gcvs/gcvs/vartype.htm>).

Note on magCode:

The main codes are p (photographic magnitudes), Johnson's B and V (visual, photovisual, or Johnson's V).

The designations u,v,b,y refer to the Stroemgren system.

The designations r',i',g' etc. refer to the Sloan system.

The symbols "Ic" and "Rc" mean magnitudes in Cousins' I system.

"g" designates magnitudes in the system of Thuan and Gunn; "r" are red magnitudes not tied to a particular system.

Note on Ref1 and Ref2:

Code in the file "ref.txt" and catalog abbreviations (see below).

If symbols "DM" are given, the standard naming convention of "The Henry Draper Catalogue" being used (BD for zones +89 to -22 degrees; CoD for -23 to -51 degrees; CPD for -52 to -89 degrees).

Note on Desig:

The identification of the suspected variable in the paper referenced above.

Some identifications are given by coordinate designations, a 6-digit number consisting of hours, minutes, and seconds (or tenths of a minute) of time and degrees and minutes of declination with sign included. An asterisk (*) signifies that a designation is given in the remarks to the published catalog.

Stars are sometimes designated with numbers from the catalogs of Zinner (1929) and Prager (1934, 1937) because the original discovery publications were not

available to the NSV compilers. The catalogs of Zinner and Prager give detailed references to early observations of such stars.

Note on SpType:

The following symbols are used:

A/F	A-F range
B/A	B-A range
e	emission spectrum
ea	e sub alpha
ev	variable emission in spectrum
F/G	F-G range
K/M	K-M range
T	characteristics of T Tauri stars

Note on VarName:

"=" in byte 134 appears in the cases:

1. if the variable is equivalent to another cataloged variable NSV or GCVS;
2. if the star is equivalent to a variable in the Catalogue of Extragalactic Variable stars (http://www.sai.msu.su/gcvs/gcvs/v/EVS_CAT.DAT).

The list of the major astrometric catalogs and other data sources used, roughly in the order of our preference in identifying variable stars (see also the description of the catalogs provided for A.A. Volchkov's visualization code we used at www.simfov.ru).

Gaia EDR3 - Gaia is the ESA mission mapping point sources on the sky to a magnitude limit of 20.7. Gaia Early Data Release 3 (Gaia Collaboration, 2021).

Gaia DR2 - Gaia is the ESA mission mapping point sources on the sky to a magnitude limit of 20.7. Gaia Data Release 2 (Gaia Collaboration et al., 2018).

Hip - The Hipparcos Catalogue (ESA 1997).

Tyc2 - The Tycho Catalogue (Hog et al., 2000).

UCAC2 - US Naval Observatory CCD Astrograph Catalog (Zacharias et al., 2004).

2MASS - The Two Micron All-Sky Survey (Skrutskie et al., 2006).

PPM - The Positions and Proper Motions (Roeser and Bastian, 1988 - 1993).

NPM - The Lick Northern Proper Motion Program (Klemola et al. 1987).

AC - The Four-Million Star Catalog (Gulyaev and Nesterov, 1992).

GSC 2.3 - The Guide Star Catalog, Version 2.3.2 (Lasker et al., 2008), Space Telescope Science Institute and Osservatorio Astronomico di Torino.

GSC - The Guide Star Catalog (Lasker et al., 1990). The symbol "ns" accompanying a GSC reference implies that the entry is marked as a nonstellar object in the cited catalog.

A2.0 - A Catalog of Astrometric Standards (Monet et al., 1998).

B1.0 - The Whole-Sky USNO-B1.0 Catalog of 1 045 913 669 Sources (Monet et al., 2003).

GCVS - the coordinates were measured by the NSV authors using Digitized Sky Survey images, plates from different collections, or other images.

Lit. - The coordinates taken from current astronomical periodicals.

The catalog abbreviations

ADS = R.G. Aitken, New General Catalogue of Double Stars, Carnegie Inst. of Washington, Publ. no. 417, vols. I, II, 1932

ALS = Catalog of galactic OB stars, B.C. Reed, Astron. J., 125, 2531-2533, 2003; CDS V/125

AN = Preliminary designations of variable stars introduced by the "Astronomische Nachrichten"

AS = P.W. Merrill, C.G. Burwell, Additional Stars whose Spectra have a Bright H Alpha Line, Astrophys. J. 112, 72, 1950 {1950ApJ...112...72M};
see also Astrophys. J. 113, 624, 1951 {1951ApJ...113..624M}

BAY = Bayer, list of bright stars having designations by Greek letters in their constellations

BAY2 = Bayer, list of bright stars having designations by Latin letters in their constellations

BD = Bonner Durchmusterung, F.W.A. Argelander, Bonner Sternverzeichniss, 1 bis 4 Sektion, Astronomische Beobachtungen auf der Sternwarte der Kgl. Rhein/Friedrich-Wilhelms-Universität zu Bonn; CDS I/119 (suedlich), I/122 (nordisch)

BPM = W.J. Luyten, Bruce proper motion survey. The general catalogue (vols. I, II), 1963 {1963BPM...C.....0L}

BS/HR = D. Hoffleit, The Bright Star Catalogue, 4th Revised Ed., Yale University Observatory, New Haven, Conn. USA, 1982 (CDS V/50);
D. Hoffleit, The Bright Star Catalogue, 3rd Revised Ed., 1964 (CDS V/36); D. Hoffleit, M. Saladyga, P. Wlasuk, A Supplement to the Bright Star Catalogue, 1983 (CDS V/36B)

BV = Bamberg observatory variable stars

CCS (CGCS) = C.B. Stephenson, A general catalogue of cool carbon stars, Publ. Warner & Swasey Obs., 1, part no. 4, 1-79, 1973; C.B. Stephenson, A general catalogue of cool carbon stars, second edition, Publ. Warner & Swasey Obs., 3, 53-214, 1989; CDS III/156

A. Alksnis, A. Balklavs, U. Dzervitis, I. Eglitis, O. Paupers, I. Pundure, General catalog of galactic carbon stars by C.B. Stephenson. Third edition, Baltic Astronomy, 10, 1-318, 2001; CDS III/227

Cl, Cl* = Lists of variables in Galaxy's open (Cl) or globular (Cl*) clusters

CoD = Cordoba Durchmusterung, J.M. Thome, Resultados del Observatorio Nacional Argentino 16 - 18; 21, 1892 - 1932; CDS I/114

CPD = Cape Photographic Durchmusterung, D. Gill and J.C. Kapteyn, Ann. Cape Obs. 3-5, 1895 - 1900; CDS I/108

CRL (AFGL, RAFGL) = Air Force Geophysics Laboratory. Four-Color Infrared Sky Survey (and supplement): S.D. Price and R.G. Walker - AFGL-TR-76-028

(Hanscom AFB, MA) Air Force Geophysics Lab., Air Force Systems Command, USAF, 1976; S.D. Price and T.L. Murdock - Air Force Geophysics Laboratory, AFGL-TR-83-0161; CDS II/94, II/95

CSS (CGSS) = C.B. Stephenson, A general catalogue of S Stars, Publ. Warner & Swasey Obs., 2, part no. 2, 1976;

C.B. Stephenson, A general catalogue of S Stars, second edition, Publ. Warner & Swasey Obs., 3, 1-49, 1984; CDS III/168

CSV = B.V. Kukarkin, P.P. Parenago, Yu.N. Efremov, and P.N. Kholopov, "Catalogue of Stars Suspected of Variability", 1951 and

B.V. Kukarkin, P.N. Kholopov, Yu.N. Efremov, N.E. Kurochkin, "Second Catalogue of Stars Suspected of Variability", 1965

(Moscow: Publishing House of the Academy of Sciences of the U.S.S.R.)

EG = O.J. Eggen, J.L. Greenstein, Spectra, Colors, Luminosities, and Motions of the White Dwarfs, Astrophys. J. 141, 83, 1965 {1965ApJ...141...83E};

additional stars in Astrophys. J. 142, 925, 1965 {1965ApJ...142..925E} and 150, 927, 1967 {1967ApJ...150..927E}; more stars added by J.L. Greenstein, see references in G.P. McCook and E.M. Sion, Astrophys. J. Suppl. 65, 603, 1987 {1987ApJS...65..603M}

FLM = Flamsteed, List of bright stars having designations by number in their constellations

G = H.L. Giclas, R. Burnham Jr., and N.G. Thomas, (Large Proper Motion Stars) - Publications of Lowell Obs., Flagstaff, Arizona, 1971; CDS I/316

GD = H.L. Giclas White Dwarfs (Lowell Obs.); CDS I/316

G1 = W. Gliese, Catalogue of Nearby Stars, Veroeff. Astron. Rechen-Inst. Heidelberg Nr. 22, 1969; W. Gliese, H. Jahreiss, Nearby star data published 1969 - 1978, Astron. Astrophys. Suppl. 38, 423, 1979 (1979A&AS...38..423G); CDS V/35, V/70

GR = Preliminary designations of variables discovered by G. Romano

GSC = The Guide Star Catalog (B.M. Lasker, C.R. Sturch, B.J. McLean, et al., Astron. J. 99, 2019, 1990); CDS I/220, I/254, I/255

HBV = Hamburg-Bergedorf observatory variable stars

HD = Henry Draper Catalogue - A.J. Cannon and E.C. Pickering, Harvard Obs. Ann. 91 - 99, 1918 - 1924; A.J. Cannon, Harvard Obs. Ann. 100, 1925 - 1936; CDS III/135

The Henry Draper Extension Charts: A catalogue of accurate positions, proper motions, magnitudes and spectral types of 86933 stars -

V.V. Nesterov, A.V. Kuzmin, N.T. Ashimbaeva, A.A. Volchkov, S. Roeser, U. Bastian, Astron. Astrophys., Suppl. Ser. 110, 367-370, 1995; CDS III/187

He = A number of lists of planetary nebulae and emission-line stars by K. Henize

Hip = The Hipparcos and Tycho Catalogues, ESA (European Space Agency) SP-1200, 1997; CDS I/239, I/259, I/311

III = E. Hertzsprung, Catalogue de 3259 Etoiles dans les Pleiades, Ann. Sterrewacht Leiden, 19, pt. 1A, 1947; CDS I/90

HRC/HBC = G.H. Herbig, N.K. Rao, Second Catalog of Emission-line Stars of the Orion Population, *Astrophys. J.* 174, 401, 1972 {1972ApJ...174..401H};

G.H. Herbig, K.R. Bell, Third Catalog of Emission-Line Stars of the Orion Population, *Lick Obs. Bull.* no. 1111, 1988; CDS V/73

HV = Harvard observatory variables

IDS = H.M. Jeffers, W.H. van den Bos, F.M. Greeby, Index catalogue of visual double stars, 1961.0, *Publ. Lick Obs.* 21, parts 1 and 2, 1963 (catalog)

Innes = Preliminary designations of variables discovered by R.T.A. Innes

IRAS = G. Neugebauer, R.J. van Duinen, H.J. Habing et al., Infrared Astronomical Satellite (IRAS) Point Source Catalog, NASA RP-1190, 1988; CDS II/125

IRC = G. Neugebauer, R.B. Leighton, Two-Micron Sky Survey, A Preliminary Catalog, NASA SP-3047, 1969; CDS II/2B

L, LFT, LP = Old lists of high proper-motion stars: W.J. Luyten, New stars with proper motion exceeding 0".5 annually, *Publ. Astron. Obs. Univ. Minnesota* 2, 242, 1942; Luyten's Five Tenths, 1955 (Note: continued by LHS); The Luyten-Palomar Survey, published from 1963 to 1981 in *Univ. Minnesota, Minneapolis, fascicules 1 to 57*

LB = Luyten faint blue stars. Note: Various lists published by Luyten under the general title: A Search for Faint Blue Stars. I to L (50 papers).

Lists are for different regions. First lists are in *Astron. J.* Vols. 58, 59, 61 (1953 to 1956), then in monographs: *The Observatory, Univ. Minnesota, Minneapolis*

LkHa (LHa, LH) = Lick H-Alpha: A number of lists of emission-line stars by G.H. Herbig

LHS = W.J. Luyten, A catalogue of stars with proper motion > 0".5 annually, 1976. Note: 1st edition in 1976, 2nd in 1979; CDS I/87,

Atlas of Identif. chart for LHS stars in 1979, all publications of *Univ. Minnesota, Minneapolis*

G.A. Bakos, K.C. Sahu, P. Nemeth, Revised coordinates and proper motions of the stars in the Luyten half-second catalog, *Astrophys. J., Suppl. Ser.*, 141, 187-193, 2002; CDS I/279

LS = Luminous stars in the Northern hemisphere. The roman numeral (LSI), (LSII), (LSIII), (LSIV), (LSV), (LSVI) in the format stands for the volume (I to VI) of the references: J. Hardorp and 7 other authors, *Luminous stars in the Northern Milky Way, Hamburger Sternw., Warner & Swasey Obs.* 1, 1959; 2, 1960; 3, 1964; 4, 1963; 5, 1965; 6, 1965

LSS = C.B. Stephenson, N. Sanduleak, Luminous stars in the Southern Milky Way, *Publ. Warner & Swasey Obs.*, 1, part 1, 1, 1971; CDS III/43

LTT = W.J. Luyten, A catalogue of 9867 stars in the Southern Hemisphere with proper motions exceeding 0".2 annually, 1957;

A catalogue of 7127 stars in the Northern Hemisphere, 1961; First supplement to the LTT catalogues, *The Observatory, Univ. Minnesota, Minneapolis*, 1962. The stars of the LTT catalogues and their supplement are all included in the new LTT (NLTT) catalogue

(T.D. Oswalt, P.M. Hintzen, W.J. Luyten, *Astrophys. J., Suppl. Ser.* 66, 391-396, 1988); CDS I/98A

MHa (MH) = Mount Wilson H-Alpha Stars, see references for MWC and AS

MWC = P.W. Merrill, C.G. Burwell, Catalogue and Bibliography of Stars of Classes B and A Whose Spectra have Bright Hydrogen Lines,

Astrophys. J. 78, 87, 1933 {1933ApJ....78...87M} (Mount Wilson Catalogue); Supplements: *Astrophys. J.* 98, 153, 1943 {1943ApJ....98..153M};

110, 387, 1949 {1949ApJ...110..387M}

NGC = J.L.E. Dreyer, A New General Catalogue of Nebulae and Clusters of Stars, being the Catalogue of the late Sir John F.W. Herschel, Bart., revised, corrected, and enlarged, Mem. R. Astron. Soc. 49, 1-237, 1888; CDS VII/118

OH = OH sources designated by their galactic coordinates

Par = A List of Stars in the Region of the Orion Nebula (P.P. Parenago, Sternberg Inst. Publ. Vol. 25, 1954; catalog)

PG = R.F. Green, M. Schmidt, J. Liebert, Palomar-Green catalog of ultraviolet-excess stellar objects, Astrophys. J., Suppl. Ser. 61, 305-352, 1986

PHL = G. Haro, W.J. Luyten, Faint blue stars in the region near the South Galactic Pole, Bol. Obs. Tonantz. Tacub. 3, 37-117, 1962; CDS III/74.
Nature of the PHL objects and Identif. charts in {1987RMxAA..15..107H}, {1988RMxAA..16..123C}, {1990RMxAA..20...47C}, {1992RMxAA..24..139C}

PK = L. Perek, L. Kohoutek, Catalogue of galactic planetary nebulae, Acad. Publ. House of the Czech. Acad. Sci., 1-276, 1967; CDS IV/24.
L. Kohoutek, D. Kuhl, Catalogue of galactic planetary nebulae (Updates Version 2000), Hamburger Sternwarte Abh. 12, parts 1 and 2, 2001;
CDS J/AN/323/484

Prag = R. Prager, Katalog von 2428 als veraenderlich angezeigten Sternen, Ergaenz. Astron. Nachr. 9, Nr. 3, 1934;
R. Prager, Katalog von 3401 als veraenderlich angezeigten Sternen, Ergaenz. Astron. Nachr. 10, Nr. 1, 1937

Ross = Preliminary designations of variables discovered by F. Ross

1RXS = W. Voges, B. Aschenbach, T. Boller et al., The ROSAT All-Sky Survey Bright Source Catalogue, Astron. Astrophys. 349, 389-405, 1999; CDS IX/10

S = Preliminary designations of variables discovered at Sonneberg observatory

SAO = Smithsonian Astrophysical Observatory Star Catalog, parts I-IV, Smithsonian Inst. Washington, 1966; CDS I/131

SVS = Soviet Variable Stars (preliminary designations of Soviet-discovered variables)

VV = Vatican variable stars

WD = G.P. Mc Cook, E.M. Sion, Catalog of Spectroscopically Identified White Dwarfs, Astrophys. J., Suppl. Ser. 65, 603, 1987 {1987ApJS...65..603M};
CDS III/129, Astrophys. J., Suppl. Ser. 121, 1-130, 1999 {1999ApJS..121....1M};
CDS III/235B, B/wd

WDS = C.E. Worley, G.G. Douglass, The Washington Double Star Catalog (WDS, 1996.0), Astron. Astrophys., Suppl. Ser. 125, 523, 1997;
CDS I/107, I/237, B/wds

WR = K.A. van der Hucht et al., The Sixth Catalogue of Galactic Wolf-Rayet Stars, Their Past and Present, Space Sci. Rev. 28, 227-306, 1981; CDS III/215

Wr = Preliminary designations of variables discovered by R. Weber

Zinn = E. Zinner, Verzeichnis von 2191 verdaechtigen Sternen, Ergaenz. Astron. Nachr. 8, Nr. 1, 1929

See also the cross-identification tables

<http://www.sai.msu.su/gcvs/gcvs/iv/html/>

You can also use the search in the GCVS database, including cross-identification with various catalogues:

<http://www.sai.msu.su/gcvs/cgi-bin/search.htm>

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Gaia Collaboration, Brown, A. G. A., Vallenari, A., et al. 2018, Astron. and Astrophys. 616, A1; CDS I/345, I/347.

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Hog, E., Fabricius, C., Makarov, V. V., et al. 2000, Astron. Astrophys. 355, L27; CDS I/250.

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