

Double star research

Unveiling a Binary Star: New Astrometric Analysis of WDS 01497+5355 ES 76

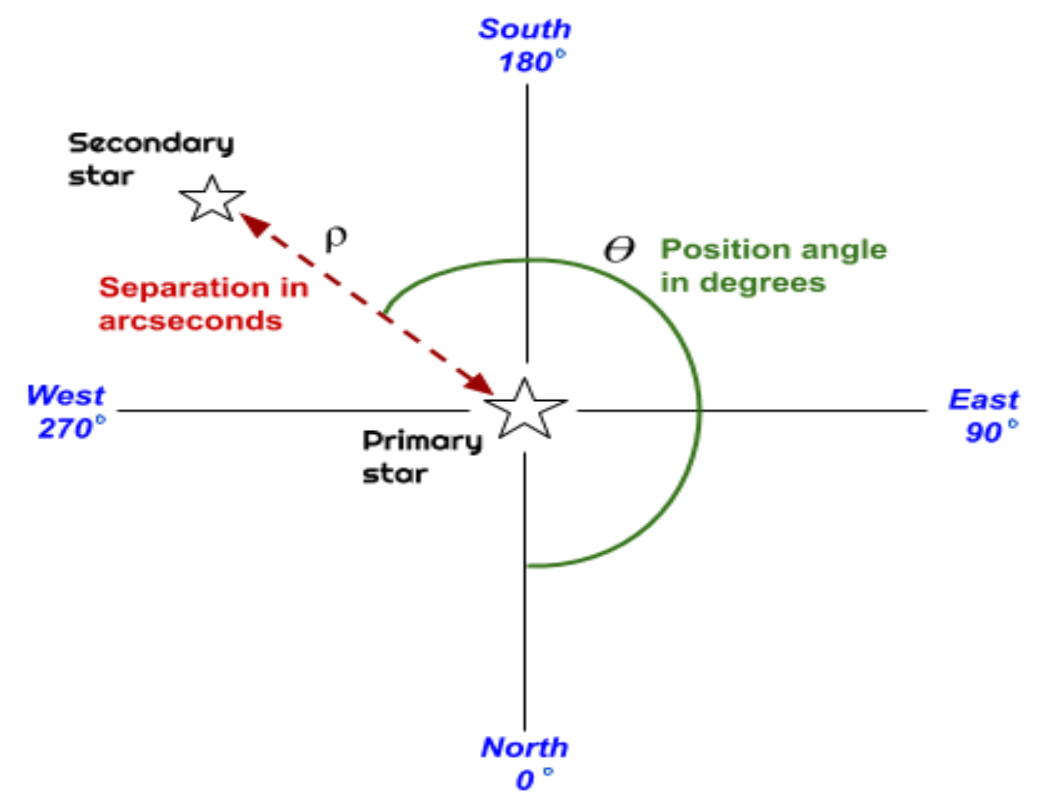


Double stars are divided into

- A) Optical stars
- B) Binary Stars



Algieba



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Right Ascension	equal to	<input type="text"/>
Declination	equal to	<input type="text"/>
Radius	less or equal to	<input type="text"/>
Coord 2000	equal to	<input type="text"/>
Discov num	equal to	<input type="text"/>
Comp	equal to	<input type="text"/>
Name	contains	<input type="text"/>
Date first	equal to	<input type="text"/>
Date last	equal to	<input type="text"/>
Mag pri	less than	<input type="text"/>
Mag sec	less than	<input type="text"/>
Delta magnitude	less than	<input type="text"/>
Separation	less than	<input type="text"/>
Spectral class	begins for	<input type="text"/>
Bayer	contains	<input type="text"/>
Flamsteed	equal to	<input type="text"/>
Constellation	equal to	<input type="text"/>
ADS	equal to	<input type="text"/>
HD	equal to	<input type="text"/>
HR	equal to	<input type="text"/>
HIP	equal to	<input type="text"/>
SAO	equal to	<input type="text"/>
Tycho2	equal to	<input type="text"/>

format: hh mm ss.dd; or hh; or dec; 00 <= hh < 24

format: +gg mm ss.d; or gg; or dec; -90 < gg < +90

Radius of search for RA and DE
 format: hhmms+ggmm

in arcseconds

greek letter only; if a number follow, insert a space

catalog number only; insert constellation above

format: nnnn-nnnnn-n



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CURRENT SYSTEM

[01497+5355](#)

[ES 761](#)

[HD 232538](#)

NEARBY DOUBLES

01497+5355 ES 761 (HD 232538)

01^h 49^m 39.60^s +53° 54' 52.8" P.A. 256.00 sep 5.2 mag 9.04,12.20 Sp B5 dist. 25000 pc (81550 l.y.)

Coord 2000	01497+5355	Discov num	ES 761	Comp		Coord arcsec 2000	01 49 39.60 +53 54 52.8
Date first	1909	Date last	2014	Obs	5		
Pa first	250	Pa last	256.3	P.A. Now (θ)	256.3°		
Sep first	4.9	Sep last	5.151	Sep. Now (ρ)	5.151"		
Mag pri	9.04	Mag sec	12.20	delta mag (ΔM)	3.16	Spectral class	B5 (blue-white)
Pri motion ra	+003	Sec motion ra					
Pri motion dec	-006	Sec motion dec					

Notes

Nature of this double is uncertain.

OTHER CATALOGS AND DESIGNATIONS

Name	HD 232538	Constellation	Perseus	SAO	22655	HIP	8503
Tycho2	3684-00577-1	Gaia DR2	408428682362836480	HD	232538	BD	BD+53 395
Distance	25000	Distance ly	81550				

Why this system??

1. Its nature is uncertain

2. It has a noticeable separation from the last measurement

3. Its last observation was in 2014, which means it will have a more noticeable separation and position difference

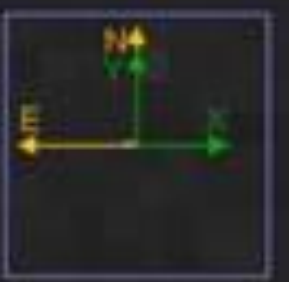
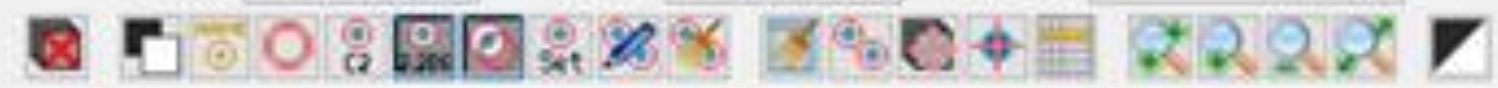
Capturing the image

Las Cumbres
^w
Observatory

<https://lco.global>



ImageJ X:	1,182.7500	ImageJ Y:	1,218.9167	Value:	0.3747
RA:	01:49:36.924	DEC:	+53:54:54.64	Peak:	15.8665
FITS X:	1,183.2500	FITS Y:	1,181.5833	Int Cnts:	81.9189



9.97"

9.97"



91.7 586.0 1263.9 2038.6 2910.2 3684.9 4556.5 5331.2 6202.7 6977.4 7752.1 8623.7 9398.4 10270.0 11238.4 12206.7 13175.1 14143.5 15111.9 16080.3 17048.7 18017.1 18985.5 19953.9 20922.3 21890.7 22859.1 23827.4

3.0 Observation

Table 2 below presents the new measurements derived from our images, while Table 3 provides a summary of the statistics for these measurements.

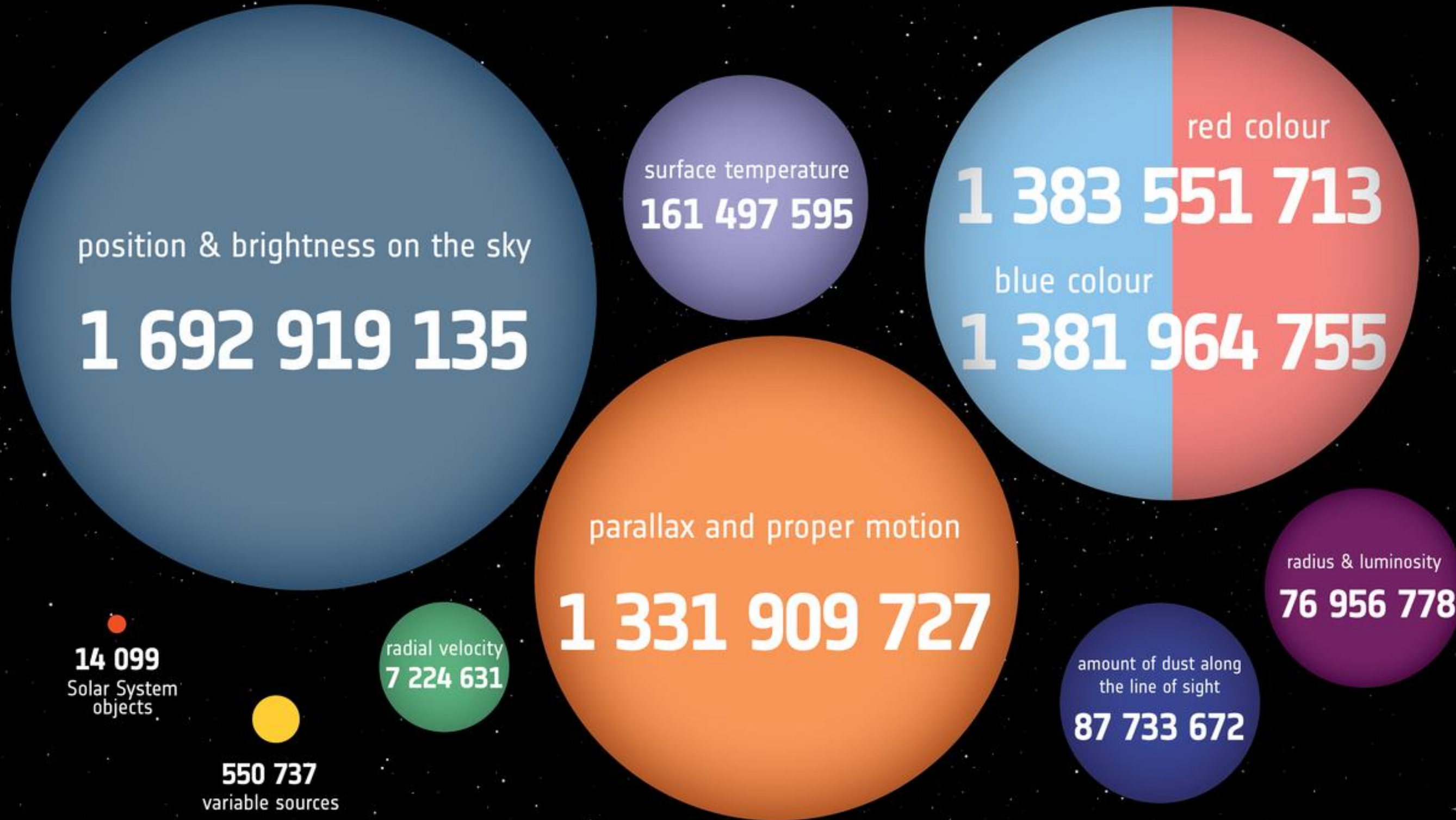
Table 2: New measurements of WDS 01497+5355 ES 761 (HD 232538) derived from our images

No	PA (°)	Sep (")
1	252.3	6.54
2	251.5	6.40
3	249.3	6.49
4	256.7	6.28
5	251.8	6.07
6	255.7	6.24
7	257.2	6.65
8	251.6	6.87
9	254.8	6.33
10	251.3	6.19

Table 3: Mean, standard deviation, and Standard error of the mean of our measurement 01497+5355 ES 761 (HD 232538)

Double Star	Date	Images		PA (°)	Sep (")
WDS 01497+5355 ES 761 (HD 232538)	8th of July, 2024 2024.5191	10	Mean	253.3	6.40
			Standard Deviation	2.50	0.225
			Standard Error of the Mean	0.79	0.071

→ HOW MANY STARS WILL THERE BE IN THE SECOND GAIA DATA RELEASE?



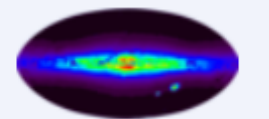
Search Criteria
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 Keywords:

References

Errors

- Show the target form
- Show constraint information

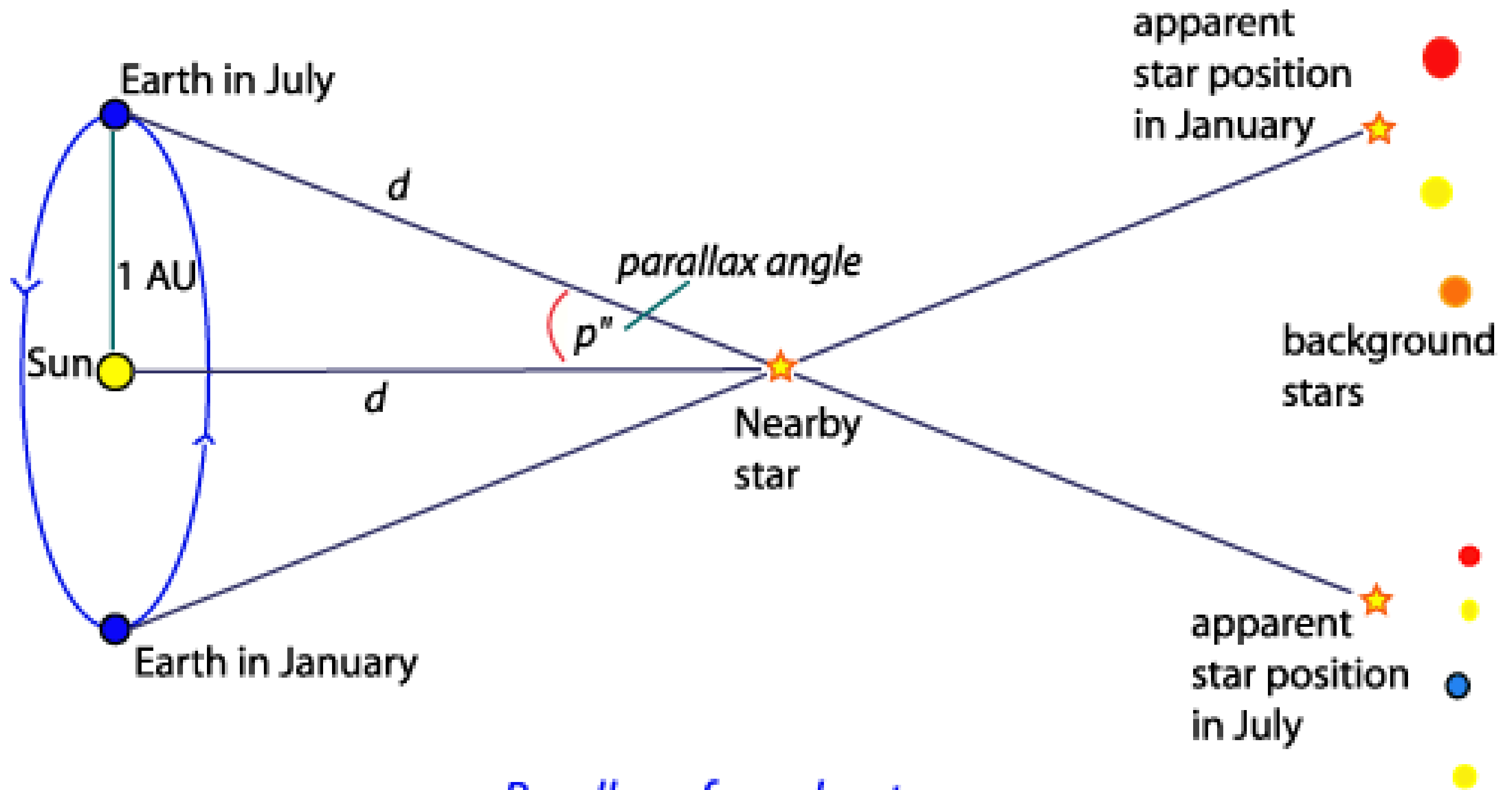
The 5 columns in *color* are computed by VizieR, and are *not part of the original data* (note that the *computed coordinates* are computed from the positions *and* the proper motions given in the table)

[I/355/gaiadr3](#) [Gaia DR3 Part 1. Main source \(Gaia Collaboration, 2022\)](#) 2022yCat.1355...0G [ReadMe+ftp](#)
[Post annotation](#) Gaia data release 3 (Gaia DR3). (original column names in green) (1811709771 rows)
 

- [start AladinLite](#)
- [plot the output](#)
- [query using TAP/SQL](#)

<i>Full</i>	<i>r</i>	<i>RAJ2000</i>	<i>DEJ2000</i>	<i>RA_ICRS</i>	<i>DE_ICRS</i>	<i>Source</i>	<i>e RA_ICRS</i>	<i>e DE_ICRS</i>	<i>Plx</i>	<i>e</i>	<i>PM</i>	<i>pmRA</i>	<i>e</i>	<i>pmDE</i>	<i>e</i>	<i>RUWE</i>
	arcmin	"h:m:s"	"d:m:s"	deg	deg		mas	mas	mas	mas	mas/yr	mas/yr	(...)	mas/yr	(...)	
1	0.0010	01 49 39.5955394817	+53 54 52.831729011	027.41497221584	+53.91466809089	408428682362836480	0.0361	0.0360	0.2078	0.0494	2.062	-1.219	0.051	-1.663	0.044	1.406
2	0.0706	01 49 39.3064734780	+53 54 49.447335491	027.41377697283	+53.91373537097	408428648004179968	1.3500	1.5887								
3	0.0745	01 49 39.9745675606	+53 54 55.758164490	027.41659157210	+53.91548000988	408428682363918848	0.3763	0.4135	0.1146	0.4952	4.504	4.091	1.489	-1.883	0.526	0.999
4	0.0844	01 49 40.1673808728	+53 54 52.067497458	027.41736408697	+53.91446319374	408428682359081088	0.6120	0.7081								
5	0.0889	01 49 40.1647324444	+53 54 50.959030040	027.41735503031	+53.91414816015	408428682363919232	0.1672	0.2776	2.1094	0.3364	1.625	0.262	0.289	-1.603	0.271	1.642
6	0.0909	01 49 39.0004406728	+53 54 51.552042190	027.41249835554	+53.91431224118	408428643708688512	0.0365	0.0382	0.1480	0.0501	1.808	-0.461	0.053	-1.748	0.048	2.937
7	0.1195	01 49 40.0190829189	+53 54 46.662106095	027.41673037259	+53.91295529479	408428682359080064	0.3164	0.2812	-0.0706	0.3890	2.542	-2.095	1.127	-1.440	0.400	1.051
8	0.2169	01 49 38.5295951944	+53 54 43.893515136	027.41053259760	+53.91218722864	408428647999346688	0.4347	0.4619	-0.0673	0.5504	1.562	-0.978	0.678	-1.218	0.625	1.020
9	0.2381	01 49 38.5556997849	+53 54 41.918960576	027.41064597679	+53.91163841243	408428643708688384	0.3344	0.3726	0.5183	0.4512	1.343	-0.367	0.591	-1.292	0.457	1.029
10	0.2492	01 49 41.1546735681	+53 54 58.693544503	027.42147702625	+53.91630895117	408428682362835712	0.0606	0.0657	0.4311	0.0840	1.172	-0.103	0.093	1.167	0.087	1.090
11	0.2639	01 49 41.2896971089	+53 54 58.166173333	027.42203260722	+53.91614631665	408428682359076736	0.7533	1.5221	-0.0083	0.9822	2.672	-1.033	0.976	-2.465	1.955	1.222
12	0.2995	01 49 40.7294476382	+53 54 37.870341348	027.41971351589	+53.91051879723	408428648001227136	1.2001	0.8426	-0.9007	1.1925	1.006	0.992	2.182	-0.167	1.016	1.007
13	0.3051	01 49 38.9220831252	+53 54 35.533676967	027.41216941670	+53.90986355340	408428643703475968	0.0651	0.0683	0.2644	0.0902	1.743	-0.786	0.101	-1.555	0.088	1.012
14	0.3219	01 49 37.4031002979	+53 54 53.283849003	027.40589379595	+53.91478849895	408428648003098624	0.0542	0.0554	0.5117	0.0723	6.906	6.301	0.094	-2.828	0.073	0.909
15	0.3254	01 49 40.4490090327	+53 55 10.861342219	027.41851499931	+53.91967922867	408428682362835072	0.2376	0.2333	0.0655	0.3107	3.152	-2.986	0.368	-1.007	0.284	1.412
16	0.3434	01 49 41.2821368554	+53 55 07.091681303	027.42199300425	+53.91864148127	408428678068427008	0.6082	0.6680	-0.3995	0.7619	2.378	-2.107	0.985	1.103	0.924	1.060
17	0.3460	01 49 41.8158454331	+53 54 45.903911171	027.42422855981	+53.91274272329	408428682359083648	0.2394	0.2458	0.0367	0.3149	1.960	-0.547	0.427	-1.882	0.296	0.982
18	0.3646	01 49 42.0775470998	+53 54 52.862431136	027.42531670365	+53.91467750004	408428682362836224	0.1037	0.1109	0.4154	0.1452	1.693	-0.849	0.171	-1.464	0.131	1.052
19	0.3774	01 49 39.5992092991	+53 54 30.180001425	027.41499102083	+53.90837596779	408428643704619008	0.1220	0.1252	0.0543	0.1626	1.821	-0.753	0.240	-1.657	0.163	0.995
20	0.3792	01 49 37.0296428672	+53 54 51.488033123	027.40428855220	+53.91429697116	408428647999344640	0.0512	0.0545	0.3691	0.0708	1.203	-0.216	0.079	-1.184	0.073	1.029
21	0.3878	01 49 36.9670840966	+53 54 52.390169767	027.40402711997	+53.91454719937	408428648003099136	0.0747	0.0805	0.4067	0.0999	1.305	-0.318	0.126	-1.266	0.100	1.116
22	0.4136	01 49 42.1913904924	+53 55 02.379746274	027.42579746039	+53.91732770730	408428682361730048	1.4959	1.4938								
23	0.4763	01 49 40.6854543175	+53 55 19.719933721	027.41952272632	+53.92214442603	408428682361237120	1.3989	1.3637								

- parallax** [0.2078 mas](#) ⁽ⁱ⁾ Parallax ([parallax](#)) ([pos.parallax.trig](#))
- pmra** [-1.219 mas/yr](#) ⁽ⁱ⁾ Proper motion in right ascension direction, pmRA*cosDE ([pmra](#)) ([pos.pm;pos.eq.ra](#))
- pmra_error** [0.051 mas/yr](#) Standard error of proper motion in right ascension direction ([pmra_error](#)) ([stat.error;pos.pm;pos.eq.ra](#))
- pmdec** [-1.663 mas/yr](#) ⁽ⁱ⁾ Proper motion in declination direction ([pmdec](#)) ([pos.pm;pos.eq.dec](#))
- pmdec_error** [0.044 mas/yr](#) Standard error of proper motion in declination direction ([pmdec_error](#)) ([stat.error;pos.pm;pos.eq.dec](#))



Parallax of nearby star

	Gaia G_{mag}	Parallax (mas)	Distance (parsec)	Proper Motion (mas/yr)	rPM
Primary Star	8.9725	0.2078	4812.3	pmra -1.219 pmdec -1.663	0.36992
Secondary Star	13.5866	0.1480	6756.8	pmra -0.461 pmdec -1.748	

rPM:

a) <0.2

b) $0.2 < x < 0.6$

c) >0.6

Double-Star Research
With
Dr. Rachel Freed of the Institute for Student
Astronomical Research, U.S.A

Website:<https://www.in4star.org/>
Email: freed2010@gmail.com



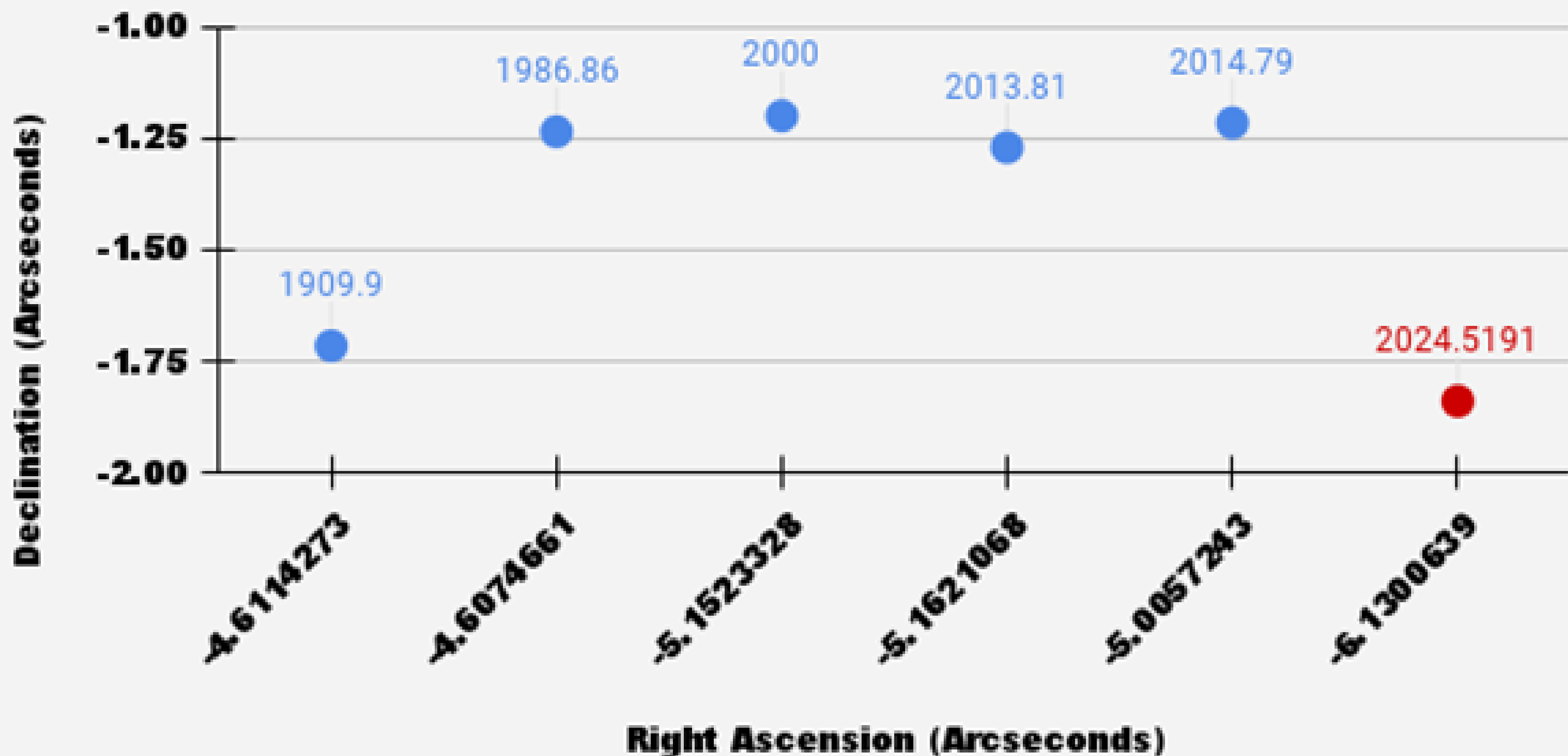
InStAR

Year	Position angle (°)	Separation (")
1909.90	249.6	4.92
1986.86	255	4.77
2000	256.9	5.29

2013.81	256.18	5.316
2014.79	256.36	5.151
2024.5191	253.3	6.4

WDS 01497+5355 ES 761

● Historical Data



The two stars are approximately 1944.5 pc apart, indicating they are not close to each other and not gravitationally bound.

The ratio of proper motion (rPM) metric is 0.36992, which is above 0.2 but below 0.6, implying that the system is a Similar Proper Motion (SPM) pair.

The curve in the plot does not emanate from the origin, which suggests that the system is not in orbit around each other. Based on this observation, along with the values we obtained for the system's rPM and parallax, we conclude that the system consists of optical double stars

THANK YOU