

# New Doubles Found Using Data from the Gaia DR2 Catalog

T. V. Bryant III

Little Tycho Observatory  
703 McNeill Road, Silver Spring, Md 20910  
[NGC7492@gmail.com](mailto:NGC7492@gmail.com)

**Abstract:** The 7.2 million stars with measured radial velocities of the Gaia DR2 catalog were scanned for possible binaries. Stars closer than 1000 parsecs and with minimal proper motion, radial velocity and parallax errors were considered. From these, 22,740 pairs with separations of under 30 arcseconds were found, for which spatial velocities, based on proper motions, radial velocities, and parallaxes were then computed. This yielded 751 pairs, of which 384 were already in the WDS and 27 in the WDSS. The remaining 334 pairs are listed in the spreadsheet mentioned in the references below.

The subset of the Gaia DR2 catalog of stars with measured radial velocities (RV) and parallaxes was downloaded from: [http://cdn.gea.esac.esa.int/Gaia/gdr2/gaia\\_source\\_with\\_rv/csv/](http://cdn.gea.esac.esa.int/Gaia/gdr2/gaia_source_with_rv/csv/)

C programs were then written to parse these data. First, the ASCII data from the above website were reformatted into a database of C structures to allow for faster processing.

Then the stars from the above catalogs were filtered based on their parallax, proper motion, and radial velocity measurements.

Parallaxes needed to be greater than 0.001 arcseconds. This limited the survey to stars closer than 1000 parsecs to the sun. It was thought that more distant stars would be more sensitive to measurement errors.

The ratios of the parallax, proper motion, and radial velocity to their errors needed to be greater than 3. Based on the Gaia team's "standard error" representing one standard deviation, this ensured that the measurement would be within one or two standard deviations of true. At one time, the USNO used to use a factor of 2 for judging the veracity of a parameter (1).

These tests pared the 7,224,519 stars in the catalog down to 1,238,288, hereafter known as the sorted Gaia list. The cause of the rejections were:

- Parallaxes < 1": 4,095,116
- Px/Pxe < 3: 8026

- PM/PMe < 3: 5007
- Rv/Rve < 3: 1,878,082

The next program searched for binaries in the sorted Gaia list.

Each star was checked to see if there was another star within 30" of it. This was a somewhat arbitrary limit. Wider pairs certainly exist, but widening this also increases the chances for false positives. The resulting 22,654 candidate pairs were then subjected to further tests.

Both members needed to be brighter than 17<sup>th</sup> G band magnitude. This was easily done, as this is the cutoff for the Gaia DR2 data.

The two stars needed to be at the same distance from the sun. Based on their parallaxes and their errors, a minimum and maximum distance to each star was computed. If these overlapped, the pair was considered to be at roughly the same distance, which was defined as being at the center of the overlap distance zone. The C programs calculated these distances in meters.

$$dist = \frac{zone\ far\ limit + zone\ near\ limit}{2}$$

The spatial velocity of each star in a pair was then computed. This is the Pythagorean vector sum of the radial velocity and the proper motions. The latter is

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based on converting the proper motions to velocities:

$$V_{pm} = PM * K * dist$$

$K$  is a constant that converts milliarcseconds/year to arcseconds/second,  $1.54 \times 10^{-13}$ .

The spatial velocity is then:

$$V_S = \sqrt{(pmRa * pmRa) + (pmDec * pmDec) + (rv * rv)}$$

where  $pmRa$  is the star's proper motion in right ascension, converted to meters/sec,  $pmDec$  is the star's proper motion in declination converted to meters/sec, and  $rv$  is the star's radial velocity.

Think of this spatial velocity parameter as the old "Common Proper Motion" measurement with the radial velocity included. As the orbital velocity of the stars in a binary is usually much less than the binaries' velocity with respect to the sun, we look for binaries whose members have similar spatial velocities.

The differential spatial velocity, which is a measure of the difference between the velocities of each star, is a good approximation of the actual orbital velocities of the stars about their mutual center of mass. This is generally much smaller than the spatial velocities of the stars. A measure of this was obtained by creating a program to search the `wds_precise.txt` file for binaries for which an orbit has been calculated. It found 489 of these, and of these, 43 were also found in the sorted Gaia list. The average ratio of the spatial velocity / differential spatial velocity was found to be  $6 \pm 15$ . This latter number should be regarded as a lower limit to an average group of physical pairs, as these stars have had large enough differential spatial velocities to have been included in orbital studies. In this paper, we limit the pairs found to those whose ratios are less than 51.46, corresponding to three standard deviations.

The following is an explanation of the columns in the spreadsheet.

- Cmpnt: The component of the binary, A or B.
- Unique source Id: The Gaia DR2 unique source id of the star.
- J2015.5: The ICRS barycentric coordinates of the pair's primary, in sexagesimal notation.
- mb, mg, bg: The blue, G, and red band brightness of the star.
- PM r, PM re: The proper motion in right ascension and its error, in mas/yr.
- PM d, PM de: The proper motion in declination and its error, in mas/yr.
- Px, Px e: The parallax and its error, in mas.
- RV, RV e: The radial velocity and its error, in meters/sec.

- The rest of the columns are only used for the A component:
- Rho: The observed separation of the pair, in arc seconds. For the A star only.
- Theta: The position angle of the pair, in degrees. For the A star only.
- Both rho and theta are derived from the epoch 2015.5 positions.
- SV/dSV: The ratio of the average spatial velocities of the stars / the differential velocity of the stars.

The 334 new binaries are listed in the Appendix. The C programs used to find these binaries and the spreadsheet containing the 334 new binaries can be downloaded here: <https://sourceforge.net/projects/gaiadr2-binarysearch/files/?source=navbar>

### Acknowledgements

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### References

- The Washington Double Star Catalog, Brian D. Mason, Gary L. Wycoff, William I. Hartkopf, Geoffrey G. Douglass, and Charles E. Worley, 2001. <http://ad.usno.navy.mil/wds/>
- The Washington Double Star Supplemental Catalog [http://www.astro.gsu.edu/wds/Supplement/wdss\\_summ.txt](http://www.astro.gsu.edu/wds/Supplement/wdss_summ.txt)
- The Gaia DR2 data with parallaxes and radial velocity can be downloaded here: [http://cdn.gea.esac.esa.int/Gaia/gdr2/gaia\\_source\\_with\\_rv/csv/](http://cdn.gea.esac.esa.int/Gaia/gdr2/gaia_source_with_rv/csv/)
- The C programs used to find these binaries and the spreadsheet containing the 340 new binaries can be downloaded here: <https://sourceforge.net/projects/gaiadr2-binarysearch/files/?source=navbar>
- (1) Thomas Corbin, personal communication.

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Appendix  
List of the New Pairs

Compnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM re	PM d	PM de	Px	Px e	RV	RV e	SV	rho	theta	SV / dSV
A	2855149058422874752	0:00:10.03 +28:54:32.55	12.58	12.25	11.76	-3.22	0.04	-1.43	0.02	3.109	0.04	50.558	1.4912	50.84	11.937	321.65	29.109
B	2855149058422874496	0:00:9.47 +28:54:41.91	12.98	12.6	12.07	-2.29	0.14	-1.03	0.06	3.078	0.096	51.411	1.2196	51.552	-	-	-
A	4683816699925419648	0:03:55.58 -77:44:39.85	12.08	11.46	10.73	-102.15	0.04	21.79	0.03	11.55	0.023	28.966	0.73719	51.78	9.2344	6.6223	73.391
B	4683816699925419264	0:03:55.92 -77:44:30.67	12.11	11.48	10.75	-101.43	0.03	23.31	0.03	11.526	0.02	29.106	0.87831	51.731	-	-	-
A	4991245614249699456	0:04:1.69 -45:15:29.36	11.73	11.24	10.65	77.3	0.04	-44.02	0.04	7.963	0.038	28.216	0.35576	60.1	5.0934	234.35	31.084
B	4991245614249699584	0:04:1.30 -45:15:32.33	13.32	12.59	11.78	75.24	0.03	-41.69	0.03	7.939	0.03	27.782	0.72731	58.351	-	-	-
A	490458330809468416	0:07:49.95 -62:04:52.44	10.38	10.09	9.68	-12.22	0.04	-13.9	0.04	5.665	0.027	22.119	0.22499	27.028	7.5119	39.648	35.244
B	490458330809468288	0:07:50.63 -62:04:46.66	12.91	12.42	11.79	-12.55	0.03	-14.69	0.03	5.637	0.022	21.844	1.8752	27.205	-	-	-
A	4901272921346044672	0:10:47.09 -63:29:59.87	12.58	12.22	11.6	9.38	0.04	-0.18	0.03	1.3	0.025	20.231	0.6869	39.945	2.0382	319.81	29.932
B	4901272921345203968	0:10:46.89 -63:29:58.31	12.66	12.29	11.67	9.17	0.04	0.11	0.03	1.28	0.028	20.089	4.3168	39.205	-	-	-
A	254747344117754880	0:27:23.54 +02:02:37.16	12.71	12.36	11.87	1.2	0.09	-9.68	0.05	2.518	0.043	20.956	1.2085	27.893	16.522	76.433	57.848
B	254747344117755008	0:27:24.61 +02:02:41.04	13.14	12.77	12.25	1.43	0.08	-9.76	0.05	2.51	0.04	20.81	1.2464	27.921	-	-	-
A	4974561899688615680	0:30:42.49 -49:45:19.06	10.68	10.41	10.02	11.64	0.03	-25.69	0.04	4.081	0.029	48.805	0.7831	58.691	12.531	55.859	60.361
B	4974561899688615552	0:30:43.56 -49:45:12.03	11.22	10.86	10.36	12.13	0.03	-26.02	0.04	4.122	0.029	49.508	0.3019	59.6	-	-	-
A	2776220371408610432	0:41:56.52 +13:08:19.21	8.36	7.66	6.88	52.8	0.08	-0.74	0.04	3.131	0.043	25.028	0.12771	83.383	6.6005	89.389	81.836
B	277622036984686336	0:41:56.97 +13:08:19.28	10.96	10.54	9.98	52.2	0.09	-0.9	0.06	3.166	0.045	24.639	0.33739	82.408	-	-	-
A	2473782999356233728	0:54:43.99 -09:46:4.16	10.89	10.34	9.68	2.61	0.08	3.09	0.04	2.013	0.042	12.268	0.18467	15.48	4.5508	36.294	7.2381
B	2473783003651019264	0:54:44.17 -09:46:0.49	13.16	12.85	12.33	2.99	0.09	3.97	0.04	2.061	0.053	12.304	1.6276	16.909	-	-	-
A	5033428102971140608	1:10:43.36 -27:59:56.27	12.22	11.92	11.48	28.67	0.05	9.91	0.04	2.551	0.035	42.033	0.9474	70.685	15.743	296.37	101.6
B	5033428102971140480	1:10:42.30 -27:59:49.28	12.31	12.01	11.56	28.71	0.05	9.91	0.04	2.509	0.036	41.343	1.7594	70.334	-	-	-
A	5029023115793367168	1:28:56.92 -29:56:29.06	11.82	11.5	11.04	13.96	0.07	-13.27	0.03	2.653	0.031	33.815	0.61522	47.989	25.299	103.36	62.687
B	5029023150153105920	1:28:58.81 -29:56:34.90	12.95	12.59	12.08	14.32	0.07	-13.04	0.03	2.708	0.029	33.688	0.99227	48.034	-	-	-
A	5011056202442185600	1:48:1.26 -35:36:59.40	13.03	12.41	11.67	-41.43	0.03	-39.1	0.03	5.234	0.028	24.993	0.78565	57.111	15.274	20.722	12.47
B	5011056408600615680	1:48:1.71 -35:36:45.11	13.28	12.71	12.01	-37.21	0.03	-36.59	0.03	5.281	0.025	25.003	0.49108	53.274	-	-	-
A	346299094205636480	2:01:39.34 +42:36:15.75	11.49	11.23	10.83	10.62	0.11	-0.59	0.18	2.454	0.123	29.271	0.5449	30.802	9.221	323.93	75.697
B	346299094205635840	2:01:38.84 +42:36:23.21	12.9	12.58	12.11	10.63	0.09	-0.47	0.09	2.433	0.066	29.666	1.6035	31.178	-	-	-
A	346275592144529920	2:03:17.06 +42:45:18.07	11.79	11.32	10.72	42.35	0.07	-62.67	0.07	6.769	0.057	20.557	1.0792	56.973	7.1667	222.26	319.23
B	346275592144530560	2:03:16.62 +42:45:12.77	12.91	12.29	11.56	42.57	0.07	-62.78	0.08	6.729	0.056	20.603	1.17	57.13	-	-	-
A	2520889895716230528	2:09:22.26 +05:59:10.33	7.09	6.86	6.56	-35.41	0.08	36.86	0.07	14.565	0.043	28.367	0.30038	32.87	25.428	132.81	145.83
B	252013927287170976	2:09:23.51 +05:58:53.05	13.67	12.69	11.72	-35.82	0.08	37.29	0.08	14.618	0.041	28.485	0.8434	33.069	-	-	-
A	4969822935852999936	2:14:12.90 -34:44:1.60	11.78	11.36	10.82	-5.2	0.02	-13.13	0.04	6.645	0.031	9.5427	0.33973	13.867	10.105	25.299	21.973
B	4969822931556565632	2:14:3.25 -34:43:52.46	12.98	12.41	11.72	-4.54	0.02	-12.58	0.05	6.665	0.033	9.4394	0.9036	13.412	-	-	-
A	4970254356729238784	2:14:40.23 -33:24:41.14	9.84	9.59	9.22	66.76	0.03	13.62	0.06	5.4	0.037	52.127	0.3277	79.51	6.9578	78.358	180.05
B	4970254356729238272	2:14:40.78 -33:24:39.74	13.01	12.5	11.84	66.61	0.02	13.24	0.05	5.364	0.033	51.873	1.7553	79.195	-	-	-
A	4965229794747027584	2:27:22.18 -38:20:41.63	10.23	9.91	9.47	28.88	0.03	-25.97	0.04	5.144	0.027	55.444	0.43146	65.928	23.919	291.4	56.813
B	4965229794747027968	2:27:20.29 -38:20:32.90	13.87	13.21	12.44	28.35	0.01	-25.85	0.02	5.167	0.015	56.498	2.3218	66.586	-	-	-
A	4738262007472153216	2:27:26.73 -58:18:14.61	9.98	9.42	8.75	39.2	0.04	8.58	0.04	3.196	0.026	22.33	0.29857	63.226	28.944	257.11	112.89
B	4738262110551368064	2:27:23.15 -58:18:21.07	11.27	10.94	10.46	39.02	0.04	8.37	0.05	3.24	0.03	22.713	0.54912	63.059	-	-	-
A	83063881526389120	2:35:9.35 +18:00:41.36	9.78	9.53	9.17	25.8	0.09	-11.72	0.07	5.309	0.045	23.887	1.0344	34.72	9.023	233.18	40.271
B	83063877231510784	2:35:8.84 +18:00:35.95	12.19	11.75	11.18	26.32	0.09	-10.9	0.06	5.352	0.043	23.889	2.3454	34.819	-	-	-

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Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM re	PM d	PM de	Pk	Px e	RV	RV e	SV	xho	theta	sv / dsV
A	4632544303762681472	2:37:50.62 -79:14:31.44	12.46	12.16	11.71	8.88	0.04	12.31	0.03	2.2	0.019	31.679	1.6506	45.561	24.305	7.2074	102.15
B	4632544303762681088	2:37:51.71 -79:14:17.33	12.93	12.62	12.14	8.92	0.04	12.27	0.03	2.195	0.019	31.251	2.0429	45.251	-	-	-
A	5063048499549442304	2:43:47.80 -32:18:36.46	10.23	9.85	9.35	46.81	0.02	12.91	0.04	5.794	0.029	37.959	0.2361	111.42	4.5209	350.8	73.525
B	5063048499549442176	2:43:47.74 -32:18:32.00	14.26	13.46	12.54	46.12	0.02	12.81	0.03	5.794	0.019	38.035	5.1398	110.05	-	-	-
A	5062833201428252032	2:45:34.35 -32:43:13.09	12.02	11.65	11.14	13.11	0.02	8.12	0.03	2.125	0.025	37.183	0.69662	50.812	7.0828	133.48	58.046
B	5062833197131250688	2:45:34.76 -32:43:17.97	12.8	12.47	11.98	12.83	0.02	7.86	0.03	2.097	0.025	37.042	3.0259	50.138	-	-	-
A	5075849185716691840	2:46:35.93 -26:17:55.67	11.79	11.53	11.12	34	0.07	23.45	0.05	2.245	0.034	30.375	0.73176	91.594	3.1139	0.61127	116.22
B	5075849185715478400	2:46:35.93 -26:17:52.55	12.66	12.38	11.91	34.23	0.07	23.26	0.05	2.289	0.036	29.894	1.5364	91.598	-	-	-
A	5048546319134426880	2:49:52.07 -38:21:26.06	13.38	12.76	12.01	17.77	0.02	-18.38	0.03	7.229	0.023	43.895	1.6826	69.192	4.6504	67.185	27.165
B	5048546319133307392	2:49:52.44 -38:21:24.26	14.07	13.32	12.49	18.59	0.01	-19.21	0.02	7.228	0.014	43.082	3.2102	70.597	-	-	-
A	43775815938166656	2:50:7.28 +48:08:44.10	8.24	7.98	7.6	28.11	0.08	-36.3	0.07	5.229	0.042	20.668	1.118	98.251	19.145	175.93	168.73
B	43775815938171136	2:50:7.41 +48:08:25.00	14.71	13.89	13.01	28.37	0.04	-36.2	0.04	5.247	0.023	20.668	3.3566	98.417	-	-	-
A	4620147962993968512	2:56:15.05 -81:00:24.03	12.04	11.27	10.44	-41.8	0.03	75.78	0.03	17.792	0.019	5.7856	0.50673	23.783	7.5399	96.479	31.394
B	4620147967290573184	2:56:18.25 -81:00:24.88	14.84	13.62	12.52	-39.92	0.04	77.93	0.04	17.768	0.028	5.815	1.5606	24.053	-	-	-
A	4620682566163238528	2:56:30.80 -78:36:19.79	12.67	11.91	11.08	20.11	0.03	11.91	0.03	11.45	0.019	29.34	0.4529	30.891	15.616	66.979	158.48
B	4620682570459817728	2:56:35.65 -78:36:13.68	14.48	13.38	12.33	19.65	0.04	11.99	0.03	11.48	0.02	29.367	1.0886	30.871	-	-	-
A	4620459781916118528	2:58:39.05 -79:42:49.43	12.2	11.82	11.28	14.19	0.03	5.09	0.03	4.243	0.016	18.234	1.093	24.837	13.914	114.91	52.017
B	4620459713196642304	2:58:43.76 -79:42:55.29	12.63	12.21	11.64	13.96	0.04	5.36	0.04	4.229	0.019	17.973	0.67774	24.554	-	-	-
A	4755584332131287296	2:58:59.79 -43:13:16.01	11.88	11.5	10.98	0.74	0.04	10.55	0.05	3.723	0.028	51.848	2.8357	53.588	5.9839	228.7	55.03
B	4755584327835075584	2:58:59.38 -43:13:19.96	12.11	11.78	11.3	0.09	0.03	10.85	0.05	3.681	0.027	52.187	0.43264	54.005	-	-	-
A	135728461272993792	3:05:50.40 +32:03:16.45	11.27	10.86	10.31	56.51	0.17	-12.69	0.1	5.457	0.067	18.414	0.98273	53.265	4.4328	33.964	35.752
B	135728461272993664	3:05:50.59 +32:03:20.12	11.96	11.55	10.98	57.99	0.62	-11.77	0.31	5.589	0.126	18.449	1.3059	54.295	-	-	-
A	5106046306204264576	3:15:5.90 -17:38:38.51	13.21	12.44	11.59	25.45	0.07	6.3	0.06	10.024	0.05	13.893	2.2503	18.586	3.2979	114.13	22.7
B	5106046310500303616	3:15:6.11 -17:38:39.86	13.26	12.47	11.62	24.16	0.06	7.32	0.06	10.102	0.042	13.662	1.6859	18.11	-	-	-
A	5170082245658820352	3:20:45.63 -05:23:39.57	11.64	11.3	10.83	19.05	0.08	11.64	0.09	2.54	0.054	78.055	0.84004	88.725	11.962	19.068	101.04
B	5170082310082578816	3:20:45.90 -05:23:28.27	11.77	11.47	11.03	19.15	0.08	11.37	0.1	2.477	0.055	77.37	1.3293	88.075	-	-	-
A	5061699428843271040	3:23:36.87 -26:06:35.93	12.42	12.06	11.55	-13.63	0.03	-29.53	0.03	4.428	0.025	59.864	0.74302	69.21	11.222	198.16	90.412
B	5061699433143885696	3:23:36.61 -26:06:46.59	12.56	12.19	11.67	-13.93	0.04	-30.17	0.03	4.451	0.026	59.728	0.67975	69.476	-	-	-
A	505363241511030424	3:28:32.66 -33:37:34.82	12.39	12.12	11.69	18.42	0.03	18.98	0.04	2.73	0.024	23.175	1.4679	51.31	23.06	84.277	62.767
B	5053632213247719552	3:28:34.49 -33:37:32.52	12.58	12.23	11.73	18.02	0.04	19.16	0.05	2.756	0.032	22.88	1.0863	50.952	-	-	-
A	4729331189915432064	3:31:42.58 -57:43:34.40	11.52	11.15	10.64	31.13	0.07	28.77	0.08	4.508	0.039	10.567	1.7831	74.125	29.534	80.239	48.377
B	4729332667384182328	3:31:46.22 -57:43:29.40	14.38	13.65	12.85	31.95	0.02	29.11	0.02	4.515	0.015	10.75	2.5473	75.579	-	-	-
A	491932089365448320	3:36:22.08 +67:07:22.12	12.37	11.97	11.43	8.55	0.02	1.57	0.03	3.669	0.023	18.458	0.82687	21.612	26.027	193.8	107.39
B	491931226074349824	3:36:21.02 +67:06:56.84	12.74	12.31	11.73	8.53	0.02	1.69	0.03	3.664	0.022	18.584	0.63447	21.722	-	-	-
A	4667295055952796800	3:36:44.14 -69:12:12.53	12.42	11.77	11.03	7.06	0.03	16.85	0.03	9.775	0.021	34.195	0.78923	35.327	16.231	299.01	74.456
B	4667295128968528896	3:36:41.47 -69:11:54.66	12.69	12	11.22	6.66	0.03	17.28	0.03	9.746	0.021	34.577	0.51123	35.728	-	-	-
A	5107368988628305792	3:41:42.59 -18:42:10.75	11.19	10.83	10.08	-21.34	0.05	-7.31	0.03	10.227	0.038	21.11	4.2954	23.541	1.5328	153.44	13.594
B	5107368988630969344	3:41:42.64 -18:42:12.12	11.37	11.16	10.11	-18.65	0.07	-9.89	0.05	10.308	0.047	21.209	0.54489	23.343	-	-	-
A	5056129616471590784	3:42:20.61 -29:29:33.33	13.37	12.85	12.21	4.45	0.02	-5.8	0.03	1.152	0.023	75.647	0.87176	75.722	26.578	115.43	125.59
B	5056129616471590656	3:42:22.44 -29:29:44.75	13.75	13.27	12.66	4.5	0.02	-5.79	0.02	1.151	0.016	76.252	0.9264	76.327	-	-	-
A	3273540136467138816	3:50:8.89 +05:42:2.55	11.24	10.83	10.26	17.38	0.18	-10.74	0.16	5.781	0.109	32.789	0.28823	34.12	3.3147	236.65	25.959
B	3273540136467138944	3:50:8.70 +05:42:0.72	13.72	13.1	12.25	19.91	0.05	-9.78	0.03	5.862	0.024	32.391	1.9063	33.973	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	3257671160022193792	3:50:35.58 +00:17:44.82	12.33	11.79	11.14	0.46	0.05	-20.71	0.04	8.042	0.037	50.308	0.91528	51.759	12.332	12.649	67.944
B	3257671160022193408	3:50:35.76 +00:17:56.85	12.7	12.11	11.4	0.33	0.05	-21.01	0.04	8.088	0.033	51.051	0.46299	52.523	-	-	-
A	3195154921731577472	3:53:26.53 -08:00:54.78	8.15	7.63	7	20.4	0.06	13.25	0.06	3.412	0.043	61.281	0.14618	69.847	17.813	83.803	153.21
B	3195154921731577216	3:53:27.72 -08:00:52.85	11.73	11.43	10.99	20.55	0.05	13.47	0.05	3.464	0.037	61.554	0.69452	70.249	-	-	-
A	4859237350570120704	3:54:2.63 -33:42:33.31	12.56	12.18	11.63	47.13	0.03	38.53	0.04	4.688	0.022	22.961	1.4469	65.622	2.7202	150.71	27.045
B	4859237354865833728	3:54:2.73 -33:42:35.68	12.83	12.43	11.85	46.61	0.03	36.22	0.04	4.701	0.022	22.855	2.9777	63.84	-	-	-
A	4625471081036145152	4:00:31.56 -79:16:52.81	10.91	10.64	10.23	7.02	0.03	6.52	0.03	3.018	0.022	21.473	1.0191	26.222	3.1913	229.98	35.984
B	4625471081036145152	4:00:30.69 -79:16:54.87	11.71	11.43	10.98	6.67	0.05	6.23	0.05	3.025	0.029	21.596	0.65798	25.921	-	-	-
A	4626207715173281792	4:01:31.44 -77:48:22.29	11.23	10.83	10.29	81.43	0.09	113.13	0.09	6.957	0.044	49.982	0.48409	224.59	6.2911	9.2898	118.63
B	4626207715173281792	4:01:31.76 -77:48:16.08	13.65	12.92	12.09	82.47	0.03	113.07	0.03	6.951	0.017	49.025	1.2184	225.24	-	-	-
A	5097068901139460608	4:02:10.56 -17:16:3.70	11.61	11.42	10.73	-10.69	0.05	-65.71	0.05	5.966	0.054	7.2455	0.57148	53.207	1.7541	256.46	35.31
B	5097068901139460736	4:02:10.44 -17:16:4.11	11.96	11.82	10.96	-12.53	0.05	-66.24	0.05	6.007	0.052	7.2301	1.4133	53.865	-	-	-
A	167319217046686720	4:02:31.23 +29:48:30.39	11.14	10.7	10.12	43.29	0.09	-43.07	0.04	8.897	0.039	31.591	0.29956	45.345	6.9816	100.71	32.978
B	167319217046686464	4:02:31.76 +29:48:29.09	13.63	12.8	11.91	41.41	0.11	-44.63	0.04	8.908	0.045	31.164	1.129	44.978	-	-	-
A	5091317699411798016	4:07:31.49 -19:33:30.29	13.8	12.7	11.68	37.13	0.05	66.35	0.05	16.134	0.042	39.636	0.40226	45.48	5.7936	248.15	154.39
B	5091317699411798272	4:07:31.11 -19:33:32.44	14.26	13.09	12.02	37.08	0.06	65.53	0.05	16.194	0.047	39.805	1.8241	45.522	-	-	-
A	3203226986346709376	4:14:10.13 -05:28:5.62	10.84	10.36	9.76	0.63	0.04	16.93	0.02	3.451	0.036	68.925	0.22621	72.713	11.295	356.13	128.74
B	3203226986346708864	4:14:10.07 -05:27:54.35	12	11.68	11.21	0.41	0.05	17.25	0.02	3.484	0.036	69.121	0.59354	73.036	-	-	-
A	3304016331045896704	4:14:17.16 +11:30:11.98	12.04	11.44	10.72	35.29	0.08	1.09	0.08	4.675	0.042	58.127	0.67662	68.161	6.8382	231.83	70.089
B	3304016326749595136	4:14:16.79 +11:30:7.75	13.57	12.86	12.02	34.47	0.08	1.52	0.07	4.725	0.038	58.395	1.4946	67.971	-	-	-
A	274990748628370304	4:15:54.88 +53:16:16.40	13.21	12.7	11.98	19.09	0.06	-14.61	0.04	3.094	0.049	25.617	2.6758	45.04	21.402	122.57	65.611
B	274990748628370560	4:15:56.89 +53:16:4.88	13.41	12.86	12.17	19.07	0.06	-14.3	0.04	3.064	0.044	25.131	2.2695	44.507	-	-	-
A	4884172869834764544	4:17:48.18 -32:30:58.81	12.27	11.81	11.22	26.8	0.03	-5.54	0.04	6.281	0.023	16.754	0.64299	45.38	7.1511	9.5336	18.481
B	4884172972913979392	4:17:48.27 -32:30:51.76	12.3	11.84	11.24	26.15	0.03	-4.12	0.04	6.281	0.022	16.516	0.59643	44.013	-	-	-
A	164857891549222400	4:19:14.50 +29:14:23.09	12.14	11.52	10.77	6.65	0.08	-6.5	0.06	2.48	0.039	51.24	0.48007	54.319	2.7928	238.62	128.65
B	164857887255386240	4:19:14.32 +29:14:21.63	12.64	12.22	11.61	6.58	0.09	-6.3	0.07	2.404	0.045	51.337	1.2076	54.29	-	-	-
A	3204220768762610048	4:20:22.59 -02:57:6.81	12.09	11.78	11.32	16.07	0.05	5.92	0.02	2.344	0.037	33.359	0.87792	47.758	14.275	59.542	85.181
B	3204220768762609920	4:20:23.41 -02:56:59.57	12.24	11.93	11.47	15.95	0.05	6.17	0.02	2.41	0.04	33.45	0.76975	47.788	-	-	-
A	3198080172417733120	4:28:24.36 -07:36:4.35	13.56	12.66	11.73	126.46	0.05	32.84	0.03	10.778	0.044	109.08	1.0523	123.22	6.1378	228.92	219.76
B	3198080172417733248	4:28:24.65 -07:36:8.39	13.67	12.75	11.81	126.63	0.05	32.02	0.03	10.838	0.045	108.66	0.98924	122.84	-	-	-
A	47815624590001464704	4:29:8.57 -51:00:16.72	11.89	11.64	11.21	8.69	0.03	14.53	0.03	2.414	0.018	67.464	1.166	75.179	2.7318	287.27	143.97
B	4781562459000378880	4:29:8.29 -51:00:15.91	12.18	11.92	11.48	8.73	0.03	14.62	0.05	2.428	0.021	66.98	1.7327	74.83	-	-	-
A	151801500204394624	4:32:25.34 +27:22:2.98	11.34	10.69	9.93	16.22	0.11	-32.62	0.08	6.633	0.052	12.087	0.81726	28.629	2.4307	264.6	34.879
B	151801500203558272	4:32:25.16 +27:22:2.75	13.02	12.32	11.36	16.29	0.11	-33.77	0.09	6.676	0.052	11.963	0.586	29.268	-	-	-
A	4894385511791292928	4:34:16.23 -25:09:41.70	11.62	11.18	10.62	3.52	0.03	-3.43	0.04	7.932	0.027	38.916	0.50971	39.026	12.329	249.89	106.38
B	4894385511791293312	4:34:15.37 -25:09:45.94	12.37	11.84	11.18	3.59	0.03	-2.84	0.04	7.949	0.023	39.011	0.67989	39.107	-	-	-
A	3184495362657632512	4:41:20.84 -10:23:27.30	11.95	11.56	11.03	-4.3	0.08	-12.87	0.08	3.454	0.061	49.511	0.6927	52.792	22.04	247.51	85.583
B	3184495328297894912	4:41:19.46 -10:23:35.74	12.78	12.39	11.85	-4.26	0.04	-13.32	0.04	3.536	0.029	49.415	0.73714	52.9	-	-	-
A	4774266954536267008	4:41:58.41 -58:23:2.52	12.74	12	11.19	16.93	0.03	83.07	0.05	10.675	0.026	17.855	0.67783	41.659	13.995	244.74	53.423
B	4774266958832573696	4:41:56.80 -58:23:8.49	13.48	12.6	11.69	15.3	0.04	83.08	0.05	10.681	0.026	17.571	0.75978	41.417	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	4877433688190338944	4:42:40.46 -32:24:31.10	11.09	10.52	9.85	11.84	0.02	4.56	0.04	2.353	0.019	90.735	0.38713	94.315	15.203	84.478	150.37
B	4877433791269511808	4:42:41.65 -32:24:29.63	12.15	11.79	11.28	11.78	0.02	4.46	0.04	2.32	0.02	91.318	0.39407	94.825	-	-	-
A	4790165141056466176	4:43:11.64 -46:07:54.80	10.75	10.21	9.57	0.99	0.03	10.72	0.06	1.942	0.023	39.702	0.34631	47.759	7.439	72.35	189.6
B	4790165136760480896	4:43:12.33 -46:07:52.54	11.84	11.54	11.09	1.08	0.03	10.76	0.07	1.902	0.024	39.635	1.1097	47.77	-	-	-
A	4677164826376376832	4:43:20.34 -62:13:56.37	11.34	11.08	10.67	3.1	0.03	29.96	0.04	3.526	0.019	10.611	0.72526	41.913	18.324	127.62	79.01
B	4677164826376376576	4:43:22.41 -62:14:7.55	11.65	11.37	10.95	2.72	0.03	30	0.04	3.517	0.019	10.742	1.2953	41.951	-	-	-
A	3292706513925377408	4:47:50.37 +08:40:33.85	11.52	11.23	10.8	19.18	0.06	-14.93	0.04	2.618	0.04	63.014	1.0589	71.003	28.775	281	340.23
B	3292706509628947968	4:47:48.46 +08:40:39.34	12.13	11.82	11.35	19.16	0.06	-15.05	0.04	2.617	0.038	63.144	1.2171	71.154	-	-	-
A	273061002639182848	4:50:11.41 +53:24:1.63	11.14	10.9	10.54	25.44	0.05	-25.4	0.03	2.352	0.034	66.64	0.76139	98.366	12.473	211.41	59.011
B	273060968279445376	4:50:10.68 +53:23:50.98	12.36	11.83	11.16	25.87	0.09	-25.79	0.05	2.352	0.042	67.848	6.8765	100.04	-	-	-
A	322549494866822656	4:54:24.22 -02:33:2.69	12.15	11.75	11.2	14.85	0.06	2.6	0.04	5.131	0.035	48.697	0.63851	50.661	20.713	320.7	63.364
B	3225495189184991104	4:54:23.35 -02:32:46.66	12.83	12.35	11.73	15.15	0.06	2.18	0.04	5.101	0.036	48.061	1.3511	50.11	-	-	-
A	340819354549509120	4:55:41.34 +18:54:15.78	11.44	10.6	9.73	1.45	0.07	-26.51	0.04	1.928	0.04	23.818	0.31065	69.95	4.7542	108.96	65.132
B	3408193477228627328	4:55:41.66 +18:54:14.23	13.48	12.88	12.12	1.88	0.09	-26.51	0.06	1.899	0.041	23.68	1.445	69.966	-	-	-
A	4776880772849644672	4:55:54.75 -54:07:11.22	11.49	11.18	10.73	19.85	0.03	-6.95	0.04	4.893	0.022	66.013	0.57745	69.06	15.605	293.28	38.716
B	4776880772849644288	4:55:53.12 -54:07:5.05	12.01	11.64	11.14	18.45	0.03	-7.88	0.04	4.935	0.022	65.299	0.69531	68.107	-	-	-
A	4881521328825805696	4:56:20.59 -26:04:14.37	13.05	12.5	11.81	29.13	0.07	14.62	0.1	4.047	0.061	67.5	1.2535	74.464	25.332	222.33	20.539
B	4881521328825806592	4:56:19.33 -26:04:33.10	13.34	12.87	12.26	25.62	0.03	15.75	0.04	4.012	0.024	67.014	1.9471	73.025	-	-	-
A	261102954693330816	4:57:16.38 +53:30:47.04	12.07	11.84	11.4	1.37	0.04	-8.75	0.03	1.788	0.036	14.782	3.6007	28.07	2.3542	344.24	71.268
B	261102954689454592	4:57:16.31 +53:30:49.30	12.93	12.64	12.07	1.3	0.05	-8.87	0.04	1.729	0.038	14.911	4.4568	28.386	-	-	-
A	3409014949855411584	4:59:24.85 +20:29:19.20	12.59	12.08	11.42	31.95	0.08	-11.57	0.04	2.891	0.045	98.136	1.8443	112.56	7.9581	191.02	110.24
B	3409014949855412480	4:59:24.74 +20:29:11.39	13.64	13.09	12.39	32.17	0.04	-11.71	0.02	2.935	0.026	97.209	1.3342	111.95	-	-	-
A	4814092232063648768	5:00:14.52 -40:31:0.14	11.56	11.09	10.49	0.27	0.03	-3.04	0.05	2.258	0.024	47.395	0.47338	47.824	22.196	138.72	38.109
B	4814092025905218304	5:00:15.80 -40:31:16.82	13.23	12.89	12.41	0.44	0.03	-2.65	0.04	2.269	0.021	46.529	3.0791	46.867	-	-	-
A	4764156051765350784	5:02:57.98 -56:32:40.25	12.06	11.74	11.26	-8.88	0.04	12.69	0.03	2.811	0.018	32.607	3.1524	41.695	3.1556	231.25	252.1
B	4764156056060385664	5:02:57.68 -56:32:42.22	12.56	12.27	11.81	-8.84	0.04	12.62	0.03	2.84	0.018	32.512	1.767	41.537	-	-	-
A	2975173500059519616	5:03:16.04 -19:53:47.48	12.11	11.88	11.5	7.83	0.03	12.87	0.03	1.856	0.028	18.708	1.1752	43.182	2.9925	204.19	36.842
B	2975161714665963904	5:03:15.95 -19:53:50.21	13.05	12.8	12.35	7.72	0.03	12.44	0.03	1.812	0.03	18.882	3.2953	42.275	-	-	-
A	2975609284621432064	5:06:22.57 -18:59:3.58	11.33	10.99	10.5	10.65	0.03	26.07	0.03	5.565	0.026	40.631	0.54762	47.153	3.4373	269.8	26.278
B	2975609284621432192	5:06:22.32 -18:59:3.59	12.64	12.16	11.53	8.6	0.03	25.91	0.05	5.599	0.031	41.039	0.58598	47.141	-	-	-
A	4663937422320817024	5:07:40.09 -64:25:11.35	12.48	12.16	11.68	-16.66	0.04	-4.36	0.04	2.32	0.022	32.388	1.8294	47.799	22.203	69.515	10.349
B	4663937422622954240	5:07:43.30 -64:25:3.58	12.71	12.38	11.89	-15.23	0.04	-6.06	0.04	2.326	0.023	32.042	1.2069	46.328	-	-	-
A	3421953659092063360	5:08:13.06 +27:22:6.56	13	12.36	11.55	12.76	0.08	8.73	0.05	3.727	0.046	37.946	0.69514	42.737	2.7693	189.64	48.152
B	3421953659093415808	5:08:13.03 +27:22:3.83	13.4	12.75	11.93	12.56	0.09	9.39	0.06	3.731	0.047	38.1	1.929	43.003	-	-	-
A	202547084267134976	5:08:19.38 +43:55:3.91	12.24	11.82	11.26	4.24	0.08	-27.33	0.07	4.962	0.066	50.561	1.9603	57.118	14.882	235.34	67.898
B	202547084267135104	5:08:18.25 +43:54:55.44	12.73	12.25	11.64	4.61	0.08	-27.4	0.07	4.907	0.066	51.327	0.50766	57.854	-	-	-
A	2955728327684078592	5:10:52.02 -27:07:40.13	11.35	11.03	10.56	4.7	0.04	21.44	0.04	2.205	0.023	57.82	0.31569	74.519	5.8639	59.803	231.59
B	2955728327684078464	5:10:52.40 -27:07:37.18	13.98	13.61	13.07	4.81	0.02	21.54	0.03	2.216	0.017	57.772	3.6884	74.646	-	-	-
A	2990132046517242496	5:10:53.06 -11:07:30.72	12.13	11.53	10.82	5.88	0.06	-5.45	0.05	1.024	0.038	81.913	0.44104	83.694	3.7974	157.57	86.07
B	2990132042220930560	5:10:53.16 -11:07:34.23	13.41	13	12.41	5.82	0.05	-5.35	0.04	1.029	0.028	80.979	2.0462	82.73	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	3242368706941778688	5:12:28.17 +08:23:0.10	12.57	11.71	10.81	61.81	0.07	27.46	0.06	15.938	0.044	47.594	0.70563	51.674	5.3103	194.39	52.961
B	3242368702645853184	5:12:28.08 +08:22:54.95	12.64	11.76	10.86	59.07	0.07	29.11	0.06	15.928	0.043	47.396	0.11988	51.286	-	-	-
A	481116915041123072	5:15:32.84 +66:15:17.03	11.79	11.48	11.04	6.23	0.04	-7.78	0.04	1.515	0.039	29.334	0.87705	42.458	22.053	29.199	75.526
B	481116915041120640	5:15:34.62 +66:15:36.28	12.9	12.6	12.15	6.09	0.03	-7.7	0.04	1.56	0.035	29.596	2.1044	42.308	-	-	-
A	4819741759028427904	5:19:54.94 -38:44:19.21	10.94	10.56	10.06	8.28	0.04	-4.2	0.06	8.194	0.031	36.335	0.29475	36.73	15.898	119.57	18.163
B	4819741763325357056	5:19:56.12 -38:44:27.05	11.49	11.06	10.49	4.82	0.04	-3.78	0.06	8.198	0.03	36.452	0.48872	36.623	-	-	-
A	2969220812826355328	5:23:14.59 -19:28:44.62	12.39	12.07	11.6	88.61	0.03	-89.7	0.04	2.764	0.027	75.552	0.81724	229.64	11.601	137.21	351.22
B	2969220812826355456	5:23:15.15 -19:28:53.14	13	12.66	12.16	88.52	0.03	-90.02	0.04	2.75	0.026	75.87	1.4683	230.01	-	-	-
A	2969881619313335808	5:25:12.89 -18:20:23.41	10.77	10.26	9.64	23.76	0.04	36.37	0.05	4.098	0.028	92.494	0.60191	105.16	16.038	236.98	59.557
B	2969881619313335936	5:25:11.95 -18:20:32.15	11.97	11.59	11.07	23.73	0.04	36.56	0.05	4.134	0.028	94.26	0.56089	106.79	-	-	-
A	3014618136107593472	5:25:47.40 -09:16:42.96	11.07	10.74	10.26	2.52	0.06	15.85	0.06	6.066	0.04	6.3494	0.60271	14.005	11.755	141.16	45.884
B	3014618136107593600	5:25:47.89 -09:16:52.12	11.09	10.75	10.27	2.15	0.06	15.74	0.05	6.123	0.039	6.3032	0.87881	13.871	-	-	-
A	3337403615802752896	5:27:12.83 +08:28:49.33	12.32	12.03	11.4	13.14	0.07	-17.62	0.06	2.645	0.053	54.616	0.32629	67.181	2.3515	195.93	67.435
B	3337403620097762304	5:27:12.79 +08:28:47.07	12.39	12.12	11.49	13.34	0.07	-17.5	0.06	2.68	0.05	55.527	1.4396	67.949	-	-	-
A	480800452313350272	5:34:28.78 -39:49:18.70	11.65	11.74	10.91	10.26	0.1	1.86	0.11	2.978	0.062	58.018	1.5746	60.235	1.2167	300.41	18.293
B	480800456609278848	5:34:28.69 -39:49:18.09	11.94	12.26	11.05	9.93	0.57	-0.2	0.52	2.894	0.309	57.541	1.9958	59.572	-	-	-
A	2902138337104221184	5:36:33.91 -31:38:10.09	10.25	9.97	9.56	2.87	0.03	-11.8	0.04	6.767	0.025	28.663	0.8492	29.9	14.887	353.93	27.349
B	2902138337104220928	5:36:33.79 -31:37:55.29	13.25	12.82	11.88	1.55	0.04	-11.11	0.04	6.754	0.032	28.368	1.9319	29.497	-	-	-
A	3402639362961970560	5:40:40.34 +20:34:27.05	11.24	10.9	10.42	6.17	0.29	-18.44	0.24	3.244	0.229	21.111	0.97722	25.128	14.758	101.02	138.46
B	3402639362961969920	5:40:41.37 +20:34:24.23	12.9	12.48	11.92	6.17	0.08	-18.26	0.06	3.213	0.048	20.982	2.4123	24.954	-	-	-
A	4759115271988945152	5:45:33.82 -59:49:45.48	9.16	8.49	7.74	28.55	0.06	-22.36	0.05	3.133	0.022	50.699	0.2075	74.799	26.077	293.19	80.492
B	4759115340708421760	5:45:30.64 -59:49:35.22	13.08	12.65	12.08	28.41	0.05	-22.35	0.04	3.121	0.02	51.607	1.4818	75.289	-	-	-
A	3012438487448057728	5:46:21.60 -08:59:3.21	12.23	11.89	11.4	-2	0.06	-1.65	0.06	2.944	0.037	13.23	1.0459	13.885	5.3788	107.78	17.324
B	3012438487450350208	5:46:21.94 -08:59:4.86	12.3	11.96	11.47	-1.53	0.06	-1.69	0.06	2.892	0.033	13.033	1.4774	13.55	-	-	-
A	333710545072631552	5:47:12.38 +11:22:58.20	12.84	12.46	11.93	8.28	0.07	-8.07	0.06	3.05	0.054	44.432	2.4934	47.914	17.014	231.15	54.652
B	333710545072588416	5:47:11.47 +11:22:47.53	12.89	12.5	11.97	8.79	0.07	-8.31	0.06	3.064	0.053	44.538	1.8517	48.328	-	-	-
A	2904288981848825728	5:48:53.34 -29:28:5.61	12.32	12.05	11.64	9.33	0.03	5.75	0.03	1.997	0.022	36.794	1.1709	45.204	9.1429	175.3	12.487
B	2904288977552140288	5:48:53.40 -29:28:14.72	12.34	12.09	11.71	9.48	0.03	4.26	0.04	1.96	0.022	37.054	1.5174	44.645	-	-	-
A	2995825794464358912	5:50:54.35 -14:21:14.55	11.8	11.42	10.91	9.61	0.07	-21.51	0.08	4.721	0.039	21.69	0.91289	60.473	22.541	250.55	47.189
B	2995826000622789376	5:50:52.89 -14:21:22.06	12.65	12.19	11.58	9.47	0.06	-22.03	0.08	4.723	0.035	21.64	1.046	61.396	-	-	-
A	2890510073927799808	5:52:58.62 -32:51:6.75	12.34	12.12	11.76	-3.68	0.03	0.04	0.03	1.474	0.021	38.948	1.6157	40.677	25.157	134.86	231.8
B	2890510005208323200	5:53:0.04 -32:51:24.50	13.04	12.78	12.37	-3.72	0.03	0.02	0.04	1.501	0.022	38.846	2.3361	40.616	-	-	-
A	3321031647146567936	5:53:30.50 +05:58:40.26	12.26	11.73	11.03	-1.46	0.07	3.49	0.06	2.128	0.044	68.088	1.03	68.599	2.601	337.11	38.046
B	3321031651442123776	5:53:30.44 +05:58:42.66	12.78	12.28	11.58	-1.5	0.12	4.18	0.1	2.182	0.062	69.075	1.6384	69.769	-	-	-
A	2884326008215945984	5:59:13.37 -37:04:1.28	12.14	11.5	10.75	14.23	0.04	7.9	0.05	11.628	0.026	24.485	0.64035	25.366	14.471	250.9	163.81
B	2884326003918783104	5:59:12.23 -37:04:6.02	12.49	11.78	10.99	14.15	0.04	7.54	0.04	11.65	0.024	24.523	0.55529	25.377	-	-	-
A	3026333673019868032	6:01:1.60 -00:36:51.50	12.59	12.09	11.45	22.14	0.38	2.28	0.36	4.579	0.25	47.026	1.8132	47.891	7.1842	309.32	47.685
B	3026333668723428096	6:01:1.23 -00:36:46.95	12.52	12.12	11.57	21.56	0.07	0.92	0.06	4.694	0.048	46.233	5.8235	47.061	-	-	-
A	2917996455873854464	6:01:58.83 -20:41:50.47	12.79	12.19	11.47	-38.8	0.03	-8.16	0.05	7.097	0.032	46.981	0.36026	53.94	4.4274	90.616	57.655
B	2917996455873854208	6:01:59.14 -20:41:50.52	13.06	12.4	11.64	-37.42	0.04	-8.16	0.06	7.087	0.033	47.12	0.75977	53.625	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	5572412688637497600	6:04:48.48 -41:39:55.65	12.5	12.16	11.67	5.73	0.03	7.56	0.03	1.488	0.022	65.518	2.3282	72.125	5.4484	355.68	94.807
B	5572412688637497344	6:04:48.45 -41:39:50.22	12.52	12.2	11.73	5.88	0.03	7.72	0.03	1.495	0.022	65.214	1.4639	72.142	-	-	-
A	5566608710351764864	6:06:29.06 -47:05:8.65	11.86	11.5	10.99	-10.05	0.03	-6.25	0.03	2.832	0.02	26.004	0.79708	32.674	8.6341	77.064	141.72
B	5566607950143308160	6:06:29.88 -47:05:6.72	12.18	11.83	11.33	-10.04	0.03	-6.14	0.04	2.84	0.02	26.142	0.5142	32.717	-	-	-
A	2991438335052025984	6:06:41.85 -16:15:36.59	8.46	8.07	7.56	12.06	0.07	36.99	0.08	13.121	0.041	35.552	0.16255	38.218	19.497	209.35	52.994
B	2991432459536767488	6:06:41.19 -16:15:53.59	13.6	12.56	11.56	10.54	0.06	37.05	0.06	13.179	0.034	35.091	0.73365	37.737	-	-	-
A	5500233976521663232	6:08:28.72 -54:34:53.05	10.62	10.16	9.58	51.51	0.04	102.74	0.04	13.149	0.023	48.154	0.30799	63.524	4.199	239.44	56.647
B	5500233976520408320	6:08:28.31 -54:34:55.19	13	12.17	11.27	50.62	0.06	104.88	0.09	13.142	0.033	48.914	0.97256	64.46	-	-	-
A	3018238136405848064	6:09:8.97 -06:46:19.43	12.67	12.39	11.95	-1.9	0.05	3.47	0.05	2.189	0.04	30.763	2.1051	31.904	14.74	80.174	39.793
B	3018238239485062912	6:09:9.95 -06:46:16.92	12.87	12.57	12.12	-1.74	0.05	3.26	0.06	2.247	0.041	30.205	2.939	31.221	-	-	-
A	2911975701998533504	6:09:27.78 -25:37:24.09	11.1	10.77	10.29	-17.22	0.04	15.4	0.06	2.879	0.039	47.666	0.37999	61.114	15.027	247.17	136.84
B	2911975663342262272	6:09:26.76 -25:37:29.92	12.78	12.45	11.96	-17.22	0.03	15.5	0.04	2.857	0.03	48.082	1.417	61.508	-	-	-
A	2885049383788385536	6:09:44.28 -36:43:10.46	11.95	11.59	11.1	10.03	0.04	-15.69	0.04	4.094	0.021	70.527	0.44455	73.732	21.122	183.21	76.208
B	2885049280709172224	6:09:44.18 -36:43:31.55	12.41	12.02	11.48	10.26	0.04	-15.27	0.05	4.122	0.025	69.74	0.40903	72.903	-	-	-
A	2886748644649356672	6:11:3.94 -33:31:6.71	12.82	12.48	11.99	10	0.03	11.76	0.04	1.957	0.023	43.567	0.71413	57.698	14.076	280.84	79.597
B	2886748644649357056	6:11:2.84 -33:31:4.07	12.89	12.55	12.07	10.09	0.03	11.72	0.04	1.911	0.024	44.254	2.0024	58.264	-	-	-
A	2912120253418014208	6:11:31.09 -24:53:29.69	10.79	10.49	10.07	11.67	0.03	-33.71	0.04	5.017	0.034	14.324	0.52873	36.69	7.1673	260.25	42.751
B	2912131901369321728	6:11:30.57 -24:53:30.90	11.93	11.55	11.04	11.2	0.03	-32.96	0.04	5.001	0.029	14.189	0.4354	35.887	-	-	-
A	549491899874075264	6:12:8.05 -57:50:50.95	10.67	10.35	9.9	3.08	0.05	31.01	0.06	6.267	0.03	45.936	0.5875	51.608	26.198	108.07	36.624
B	5494918998656586880	6:12:11.17 -57:50:59.07	11.34	10.97	10.46	1.64	0.06	32.09	0.05	6.29	0.026	45.562	0.38157	51.615	-	-	-
A	2913482170369046656	6:12:27.54 -23:29:33.17	12.68	12.42	12.01	0.78	0.02	11.87	0.04	1.992	0.026	24.926	1.7379	37.78	19.557	36.355	119.9
B	2913482170369045120	6:12:28.38 -23:29:17.43	13.04	12.76	12.33	0.76	0.02	11.99	0.03	1.982	0.025	24.802	2.7386	37.912	-	-	-
A	2897742042940677632	6:12:31.10 -28:34:4.79	11.94	11.68	11.27	-4.45	0.03	3.66	0.04	1.769	0.025	55.128	0.58071	57.293	9.2375	337.81	10.69
B	2897742042940677248	6:12:30.83 -28:33:56.24	12.07	11.8	11.4	-6.39	0.03	4.06	0.04	1.733	0.025	54.477	1.2461	58.205	-	-	-
A	5572690762000249216	6:13:16.08 -41:00:27.91	12.49	12.3	11.71	-1.12	0.04	14.32	0.04	1.7	0.02	44.036	0.77009	59.246	2.0176	239.58	46.584
B	5572690761999183616	6:13:15.92 -41:00:28.93	12.83	12.57	12.15	-0.82	0.05	14.07	0.05	1.743	0.027	44.712	4.8903	59.259	-	-	-
A	2885289008604011904	6:19:50.55 -35:53:15.20	10.64	10.42	10.08	5.53	0.03	23.71	0.04	3.055	0.025	29.368	0.5739	47.677	7.8363	182.96	58.72
B	2885289004307641216	6:19:50.52 -35:53:23.03	12.31	11.99	11.53	5.91	0.03	23.57	0.04	3.09	0.024	28.854	0.72168	47.305	-	-	-
A	5568404517780728576	6:21:10.97 -43:02:28.62	12.88	11.94	10.99	-0.43	0.04	194.47	0.05	22.828	0.022	154.48	0.65954	159.65	3.4093	193.78	81.005
B	556840452207739136	6:21:10.90 -43:02:31.93	14.03	12.83	11.72	-4.02	0.25	203.27	0.28	22.834	0.129	154.64	1.6333	160.27	-	-	-
A	2938460153973410944	6:22:29.16 -20:36:16.31	12.56	12.4	11.83	-0.51	0.04	9.23	0.05	1.321	0.028	41.166	1.4527	52.797	1.7019	209.53	26.221
B	2938460153973410816	6:22:29.10 -20:36:17.79	12.53	12.48	11.73	-1.04	0.04	9.39	0.05	1.333	0.03	40.783	1.1538	52.96	-	-	-
A	2937294809089345152	6:23:50.52 -21:50:23.29	12.16	11.82	11.33	1.13	0.02	37.46	0.04	3.966	0.027	69.668	0.55592	82.691	4.8037	1.5483	50.974
B	2937294809089344896	6:23:50.53 -21:50:18.49	13.49	13.01	12.38	1.93	0.01	38.54	0.03	4.004	0.02	70.002	0.8271	83.689	-	-	-
A	3003077039291041792	6:25:16.83 -09:53:28.45	11.17	10.82	10.33	3.55	0.07	-13	0.1	4.581	0.053	69.437	0.48956	70.838	13.025	187.28	53.706
B	3003077043588532480	6:25:16.72 -09:53:41.37	12.59	12.12	11.51	3.27	0.06	-12.28	0.08	4.539	0.049	70.494	1.4405	71.722	-	-	-
A	5575034813415768832	6:25:34.24 -37:49:56.86	11.39	11.05	10.57	-5.59	0.03	-45.24	0.04	4.424	0.023	17.392	0.43292	50.502	20.602	295.01	19.737
B	5575034886431889920	6:25:32.67 -37:49:48.15	11.88	11.5	10.98	-7.12	0.03	-47.23	0.03	4.425	0.019	17.515	0.71892	52.677	-	-	-
A	5555215192907881344	6:26:44.33 -47:39:33.98	12.65	12.09	11.39	-6.79	0.05	27.37	0.03	6.928	0.023	21.087	1.7482	28.573	28.56	111.76	19.018
B	555521496749453952	6:26:46.96 -47:39:44.57	12.91	12.13	11.27	-5.28	0.06	25.85	0.05	6.932	0.03	20.898	1.4689	27.607	-	-	-



New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	110653454295580544	6:30:2.83 +69:12:20.08	11.87	11.57	11.11	5.13	0.02	13.03	0.03	3.741	0.024	25.624	0.57473	31.123	14.514	327.7	58.864
B	110653523015057536	6:30:1.1.37 +69:12:32.35	12.22	11.9	11.42	5.5	0.02	13.01	0.03	3.774	0.023	25.379	0.87846	31.009	-	-	-
A	3355595001331909120	6:30:13.79 +13:40:20.10	11.98	11.6	10.83	-12.72	0.08	-2.81	0.07	1.726	0.049	43.572	0.65988	56.55	1.6183	118.06	26.393
B	3355595005623005568	6:30:13.89 +13:40:19.34	11.77	11.84	10.59	-12.21	0.27	-2.24	0.19	1.67	0.081	43.766	1.0503	55.636	-	-	-
A	54827953866840192	6:33:47.78 -58:36:8.33	11.92	11.46	10.83	19.78	0.78	17.84	0.9	6.495	0.377	21.309	1.1377	29.657	11.632	227.53	10.216
B	548279538668726912	6:33:46.68 -58:36:16.19	13.03	12.45	11.76	19.52	0.04	21.64	0.05	6.107	0.019	21.04	1.0158	30.854	-	-	-
A	5583620697856877184	6:36:19.55 -33:23:45.29	13.04	12.6	12.01	-16.62	0.03	11.86	0.03	3.919	0.024	27.375	2.4461	36.948	11.188	171.66	46.566
B	5583620693558790912	6:36:19.68 -33:23:56.36	13.49	12.99	12.34	-16.12	0.02	11.87	0.02	3.889	0.017	27.886	6.8682	37.008	-	-	-
A	5556126310090744704	6:36:58.17 -44:57:59.48	9.62	9.03	8.35	-11.19	0.04	12.43	0.05	2.1	0.023	19.684	0.19823	42.421	14.064	12.097	156.8
B	5556126310090743552	6:36:58.45 -44:57:45.73	12.23	11.74	11.11	-11.11	0.04	12.52	0.04	2.121	0.024	19.692	0.39765	42.452	-	-	-
A	5557212661938953392	6:40:10.01 -43:15:57.76	11.75	11.5	11.11	-2.98	0.04	2.87	0.04	2.068	0.025	51.248	1.3968	52.115	23.031	10.361	59.904
B	5557213035598239744	6:40:10.39 -43:15:35.10	13.12	12.79	12.3	-2.95	0.04	2.75	0.04	2.079	0.028	50.433	2.3054	51.27	-	-	-
A	3355962311226888704	6:40:22.89 +14:23:16.53	12.56	12.2	11.7	12.15	0.08	-27.5	0.07	2.955	0.041	108.51	1.6755	118.69	7.6781	189.47	77.413
B	3355962306928202624	6:40:22.80 +14:23:8.96	13.33	12.9	12.34	12.7	0.06	-27.01	0.05	2.966	0.034	109.5	2.1808	119.45	-	-	-
A	2925179114363591040	6:43:25.78 -23:57:5.64	12.35	11.75	11.01	-10.63	0.03	17.27	0.04	9.394	0.028	33.63	0.60374	35.155	2.1448	181.31	35.917
B	2925179084299907712	6:43:25.78 -23:57:7.78	12.74	12.11	11.29	-10.96	0.04	19.18	0.05	9.369	0.038	33.557	0.62206	35.363	-	-	-
A	2945697345669269760	6:43:40.94 -18:10:56.16	9.68	9.06	8.35	-5.97	0.08	-5.13	0.11	2.457	0.057	60.62	0.22132	62.522	26.842	1.2403	96.423
B	2945697345669266048	6:43:40.98 -18:10:29.33	11.8	11.48	11.02	-5.98	0.08	-5.03	0.11	2.421	0.057	60.005	1.0382	61.898	-	-	-
A	5583523425437410816	6:44:29.52 -32:51:29.46	11.62	11.25	10.75	-19.53	0.03	-2	0.04	2.706	0.023	35.064	0.69433	49.269	24.229	268.3	30.258
B	5583523425437258240	6:44:27.60 -32:51:30.18	12.9	12.52	11.99	-19.38	0.03	-1.12	0.04	2.674	0.021	35.484	1.7608	49.298	-	-	-
A	3351147721606561536	6:47:16.62 +11:23:54.53	11.6	11.33	10.91	2.14	0.08	-7.09	0.07	2.733	0.047	31.004	2.7162	33.494	20.973	348.07	12.903
B	3351147717131364608	6:47:16.33 +11:24:15.05	11.98	11.68	11.24	2.02	0.08	-5.6	0.07	2.809	0.048	30.916	0.93315	32.551	-	-	-
A	2949173378661733632	6:49:54.04 -14:13:45.36	12.99	12.59	12.05	-0.34	0.05	22.46	0.07	3.644	0.035	53.378	2.9984	60.753	9.8537	266.42	72.808
B	2949173378661733760	6:49:53.37 -14:13:45.98	13.44	12.99	12.4	-0.29	0.03	22.5	0.04	3.686	0.024	54.214	0.83042	61.512	-	-	-
A	5285408783347392640	6:56:18.39 -64:34:8.60	10.87	10.18	9.41	-2.76	0.04	-0.65	0.04	1.407	0.019	36.618	0.30551	37.821	12.756	93.366	27.646
B	5285408783347393152	6:56:20.37 -64:34:9.35	11.64	11.01	10.27	-2.68	0.04	-1.05	0.04	1.433	0.018	36.786	0.23526	38.019	-	-	-
A	1002527353518467712	6:58:4.58 +59:34:46.11	11.29	10.93	10.44	11.29	0.05	-38.79	0.05	5.986	0.052	28.077	0.55222	42.731	3.3521	291.92	37.069
B	1002527349223384192	6:58:4.17 +59:34:47.36	13.8	13.19	12.35	12.48	0.02	-39.54	0.02	5.93	0.027	27.785	1.6745	43.186	-	-	-
A	978874178346146944	6:58:34.48 +48:49:50.05	12.03	11.56	10.96	1.38	0.06	-20.75	0.05	7.117	0.035	39.33	1.2363	41.711	28.865	104.29	65.315
B	97887367891566848	6:58:37.31 +48:49:42.93	12.96	12.37	11.65	1.81	0.07	-20.83	0.06	7.067	0.044	39.902	1.2066	42.276	-	-	-
A	5563828011086930816	6:59:46.28 -40:23:9.25	11.21	10.94	10.54	0.56	0.04	16.15	0.04	2.031	0.028	41.959	0.79845	56.356	7.1869	322.11	39.207
B	5563828011086930048	6:59:45.89 -40:23:3.57	12.19	11.91	11.47	0.04	0.04	16.41	0.04	2.041	0.027	42.472	3.0185	57.126	-	-	-
A	3380647790374880640	7:01:34.67 +24:22:3.83	11.31	11.05	10.65	-4.38	0.11	-6.64	0.09	2.437	0.047	39.886	0.43916	42.717	26.925	34.252	85.829
B	3380647790376760704	7:01:35.78 +24:22:26.09	12.88	12.56	12.1	-4.13	0.08	-6.66	0.07	2.49	0.042	40.01	2.1041	42.752	-	-	-
A	5611282726789283840	7:03:18.62 -25:57:38.78	11	10.69	10.24	-20.24	0.03	59.43	0.05	4.925	0.028	91.041	0.28329	109.13	12.542	128.91	103.97
B	5611282726789282432	7:03:19.34 -25:57:46.66	11.64	11.29	10.81	-20.44	0.06	60.36	0.08	4.985	0.046	90.52	0.81365	109.2	-	-	-
A	3361448217115088896	7:06:10.66 +17:26:8.72	12.13	11.85	11.42	-11.28	0.07	-4.64	0.06	1.54	0.051	59.758	2.1099	70.03	26.736	174.12	11.846
B	3361448217115088792	7:06:10.85 +17:25:42.13	12.33	12.05	11.62	-11.82	0.14	-2.77	0.11	1.582	0.109	58.971	3.5493	69.271	-	-	-
A	891286360523339520	7:07:14.16 +34:00:32.67	11.72	11.46	11.06	-3.38	0.06	6.81	0.06	1.561	0.039	29.833	2.2708	37.516	10.116	119.15	31.918
B	891286360523339392	7:07:14.87 +34:00:27.74	12.65	12.4	12	-3.6	0.07	7.14	0.06	1.612	0.043	29.865	2.4264	38.267	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	3053310362614568192	7:08:11.60 -05:43:20.32	10.81	10.59	10.25	-7.76	0.07	8.1	0.07	2.493	0.054	54.554	3.6282	58.497	9.5444	201.94	73.664
B	3053310362604560768	7:08:11.36 -05:43:29.17	11.43	11.19	10.82	-7.75	0.07	8.19	0.07	2.545	0.054	53.783	2.3729	57.819	-	-	-
A	3111247066249858048	7:09:9.98 +00:13:36.93	13.92	13.2	12.4	-9.54	0.04	-11.25	0.03	5.873	0.031	82.789	2.459	83.642	11.826	143.45	105.99
B	3111246997530382336	7:09:10.45 +00:13:27.43	14.07	13.33	12.51	-9.98	0.04	-11.95	0.04	5.869	0.029	82.372	5.8192	83.326	-	-	-
A	5603423245872088832	7:09:11.55 -32:35:7.31	11.4	10.91	10.3	11.39	0.04	27.85	0.04	9.825	0.028	32.158	0.57868	35.267	4.0788	345.75	28.727
B	5603423245872087424	7:09:11.47 -32:35:3.36	14.33	13.36	12.37	9.44	0.03	29.24	0.03	9.878	0.028	32.607	2.1397	35.803	-	-	-
A	3367391047400924800	7:10:8.82 +22:04:0.14	13.02	12.53	11.92	-11.12	0.07	-16.07	0.07	4.477	0.039	30.038	1.9232	31.476	9.8334	161.09	90.452
B	3367391043103594368	7:10:9.05 +22:03:50.84	13.94	13.32	12.59	-11.16	0.04	-16.12	0.04	4.465	0.024	29.693	3.6446	31.156	-	-	-
A	2931015292022979328	7:11:11.18 -19:41:45.78	12.45	12.24	11.66	-9.6	0.05	10.95	0.05	2.329	0.038	92.712	1.6645	97.296	2.048	8.3119	77.289
B	2931015292027661440	7:11:11.20 -19:41:43.76	12.72	12.44	11.98	-9.69	0.06	11.11	0.05	2.35	0.038	93.923	1.6221	98.56	-	-	-
A	3107690661536909952	7:11:24.32 -03:28:36.68	10.26	9.74	9.09	-13.69	0.06	1.04	0.06	1.399	0.045	37.296	0.67388	59.837	15.627	266.84	66.078
B	3107690558457696640	7:11:23.28 -03:28:37.54	12.49	12.14	11.62	-13.55	0.08	1.18	0.07	1.381	0.049	36.7	1.4222	59.124	-	-	-
A	978310300679659008	7:11:37.62 +48:45:1.17	11.46	11.19	10.78	0.83	0.05	-4.87	0.03	3.098	0.033	18.607	1.0938	20.075	3.121	84.357	12.29
B	978310300677862016	7:11:37.93 +48:45:1.48	12.3	11.99	11.5	0.17	0.05	-5.72	0.04	3.118	0.033	18.465	1.2032	20.424	-	-	-
A	520788747512407040	7:14:44.60 -80:44:25.15	12.24	11.84	11.28	-2.32	0.03	-3.02	0.04	2.628	0.024	18.897	0.4127	20.116	7.2734	293.03	26.547
B	5207887471216678016	7:14:41.83 -80:44:22.31	12.42	12.01	11.44	-1.96	0.03	-3.1	0.04	2.607	0.024	18.555	0.57775	19.709	-	-	-
A	5606740536873500160	7:17:3.89 -28:48:14.46	12.93	12.94	12	-2.02	0.03	13.54	0.04	3.289	0.024	39.98	1.9419	44.594	11.488	243.41	105.1
B	5606740541177661952	7:17:3.11 -28:48:19.60	13.21	12.79	12.22	-2.09	0.03	13.26	0.04	3.282	0.024	39.905	2.3621	44.358	-	-	-
A	5510154869941629952	7:17:43.43 -48:03:1.76	11.47	10.92	10.26	-46.88	0.04	-9.64	0.04	11.292	0.021	55.327	0.32542	58.851	28.869	82.384	114.01
B	5507152447283107968	7:17:46.28 -48:02:57.93	11.92	11.29	10.56	-46.45	0.03	-10.25	0.04	11.328	0.02	55.74	0.41091	59.198	-	-	-
A	2929678629487904000	7:17:54.87 -21:18:27.28	12.37	12.06	11.6	-12.22	0.03	8.41	0.05	2.424	0.028	56.366	1.1784	63.283	19.043	261.62	83.543
B	2929678526408692480	7:17:53.52 -21:18:30.05	13.3	12.94	12.43	-12.27	0.03	8.32	0.04	2.464	0.027	55.64	2.16	62.629	-	-	-
A	3109765302536779648	7:18:51.35 -01:57:17.70	11.54	11.22	10.78	-3.21	0.07	-5.57	0.06	2.148	0.04	31.543	0.47522	34.621	20.23	138.18	129.42
B	3109765302536780288	7:18:52.25 -01:57:32.77	12.05	11.73	11.27	-3.29	0.07	-5.48	0.06	2.125	0.039	31.537	0.79537	34.581	-	-	-
A	5604766402407345920	7:19:52.29 -32:20:20.28	9.78	9.17	8.46	-9.59	0.03	16.99	0.04	1.981	0.025	56.885	0.29329	71.494	17.195	141.06	65.177
B	5604766398103492224	7:19:53.14 -32:20:33.65	12.92	12.61	12.15	-9.26	0.03	17.21	0.04	1.982	0.024	57.547	3.4773	72.066	-	-	-
A	5589179278893159808	7:20:18.68 -37:25:23.84	12.02	11.69	11.21	2.5	0.04	16.28	0.05	2.124	0.032	36.339	0.88691	51.504	21.929	312.33	77.42
B	5589179278893158016	7:20:17.32 -37:25:9.08	12.44	12.11	11.64	2.74	0.04	16.38	0.04	2.115	0.027	36.007	1.4183	51.486	-	-	-
A	5592751523455642880	7:20:50.35 -32:28:36.04	7.61	6.91	6.14	0	0.04	-1.24	0.05	2.978	0.034	42.147	0.1308	42.194	20.9	346	107.46
B	5592751587875892224	7:20:49.96 -32:28:15.76	12.8	12.45	11.95	0.22	0.04	-1.22	0.04	2.936	0.029	41.98	1.7668	42.027	-	-	-
A	3169420675987298816	7:25:7.51 +16:01:45.76	11.7	11.24	10.65	-70.21	0.08	12.32	0.08	6.954	0.04	18.4	0.52127	51.903	4.297	14.763	101.42
B	3169420680285450112	7:25:7.59 +16:01:49.91	13.48	12.77	11.96	-70.54	0.08	11.76	0.08	6.97	0.038	18.66	0.44365	52.143	-	-	-
A	5586054501205972480	7:25:58.34 -37:58:54.96	11.75	11.42	10.96	-13.14	0.04	15.94	0.05	3.847	0.024	31.378	1.1724	40.308	12.029	83.079	28.573
B	5586054501205974016	7:25:59.35 -37:58:53.51	12.42	12.03	11.5	-12.33	0.03	15.24	0.04	3.893	0.023	31.879	0.48581	39.91	-	-	-
A	30350425226672692096	7:34:22.21 -10:58:12.45	12.98	12.23	11.36	1.48	0.05	37.88	0.05	10.412	0.036	44.333	0.69139	47.584	2.2544	254.52	27.849
B	3035042522369773824	7:34:22.06 -10:58:13.05	13.32	12.52	11.62	-1.58	0.06	35.74	0.05	10.377	0.04	44.37	1.3577	47.273	-	-	-
A	674711603829696000	7:45:2.60 +21:46:10.51	10.89	10.66	10.31	-1.61	0.23	-20.69	0.19	2.943	0.162	7.1642	1.4779	11.869	24.575	309.12	37.68
B	674711599533014272	7:45:1.23 +21:46:26.02	11.57	11.32	10.93	-1.19	0.06	-20.19	0.05	2.922	0.035	7.2616	0.84759	11.738	-	-	-
A	3082028506814080384	7:46:20.68 -02:10:43.76	12.19	11.87	11.4	-3.95	0.05	1.5	0.04	2.527	0.036	45.725	5.8419	46.4	7.3123	87.838	60.667
B	3082028506814079488	7:46:21.17 -02:10:43.48	13.16	12.82	12.33	-3.77	0.05	1.29	0.04	2.556	0.036	46.295	2.4265	46.888	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	5536018853766420352	7:47:15.96 -40:46:6.23	9.45	9.13	8.68	-7.26	0.04	3.73	0.05	11.088	0.031	27.123	0.25206	27.346	11.646	293.19	60.376
B	55360188849464104832	7:47:15.02 -40:46:1.64	14.13	13.13	12.14	-8.32	0.03	3.8	0.04	11.124	0.022	27.138	0.99023	27.417	-	-	-
A	3056474241677400704	7:48:11.02 -04:51:36.23	12.63	12.18	11.6	-5.27	0.06	-2.67	0.04	3.984	0.041	33.492	0.39135	34.228	5.667	317.76	89.954
B	3056474241677400448	7:48:10.77 -04:51:32.03	13.15	12.65	12.01	-5.03	0.06	-2.51	0.04	3.951	0.041	33.655	2.1576	34.319	-	-	-
A	5535736038760438016	7:50:13.35 -41:37:32.68	13.42	12.55	11.65	-17.06	0.04	-7.52	0.05	11.615	0.031	41.168	0.77943	41.864	3.4076	18.136	30.132
B	5535736038760437760	7:50:13.44 -41:37:29.44	15.45	14.24	13.11	-14.73	0.06	-5.7	0.07	11.658	0.041	40.506	9.03	41.014	-	-	-
A	666929397968352256	7:50:30.08 +15:56:27.13	11.93	11.69	11.2	-25.42	0.09	-32.19	0.05	3.11	0.05	51.52	1.1891	81.11	1.7049	298.07	19.033
B	666929397968352384	7:50:29.97 +15:56:27.94	13.07	12.78	12.17	-25.9	0.14	-34.99	0.07	3.089	0.06	51.726	1.3976	84.24	-	-	-
A	5715824322416067328	7:51:45.66 -19:19:33.60	12.7	12.46	12.04	-5.44	0.03	4.65	0.03	1.191	0.031	60.197	2.1002	66.594	2.2863	199.35	64.449
B	5715824326718280960	7:51:45.60 -19:19:35.75	12.91	12.7	12.27	-5.62	0.03	4.54	0.03	1.193	0.031	60.808	2.3086	67.262	-	-	-
A	3039168650209832832	7:54:56.40 -09:33:34.36	10.87	10.56	10.11	-23.12	0.05	-9.39	0.04	3.053	0.034	31.64	0.28263	50.199	14.812	283.68	212.02
B	3039168650209834368	7:54:55.43 -09:33:30.86	11.71	11.41	10.95	-23.05	0.05	-9.52	0.04	3.018	0.034	31.694	0.7951	50.214	-	-	-
A	572550202940350720	7:54:59.57 -14:49:17.24	12.86	12.61	12.21	-0.37	0.05	-2.08	0.04	1.376	0.04	55.092	6.4429	55.596	11.217	123.84	112.9
B	572550202940349696	7:55:0.21 -14:49:23.48	14.19	13.86	13.38	-0.43	0.03	-1.96	0.02	1.321	0.025	54.962	8.658	55.418	-	-	-
A	670014249637796224	7:56:45.48 +19:03:43.44	11.76	11.49	11.07	-13.46	0.06	-19.41	0.03	1.717	0.037	64.927	0.78667	91.99	5.5434	254.32	93.186
B	670014249637796608	7:56:45.10 +19:03:41.94	12.37	12.11	11.71	-13.43	0.06	-19.46	0.03	1.723	0.039	65.905	2.2874	92.729	-	-	-
A	5725213842479756928	7:59:17.07 -15:22:6.14	12.38	12.04	11.56	-14.83	0.04	-1.88	0.03	2.41	0.033	56.054	0.93949	63.46	24.122	87.367	87.647
B	5725213846778203776	7:59:18.74 -15:22:5.03	12.46	12.12	11.63	-14.85	0.04	-2.04	0.04	2.352	0.035	56.707	0.72637	64.075	-	-	-
A	5544180013187441792	8:06:47.86 -37:00:48.43	11.64	11.41	11.04	-10.06	0.04	17.04	0.04	1.578	0.029	60.391	4.2226	85.079	15.555	165.34	153.82
B	5544180013187585152	8:06:48.19 -37:01:3.48	12.82	12.57	12.17	-9.98	0.05	17.01	0.05	1.549	0.033	60.88	9.3284	85.286	-	-	-
A	9023547661224262464	8:08:50.83 +33:36:55.71	10.64	10.34	9.91	-4.38	0.06	1.56	0.05	4.289	0.044	55.067	0.62107	55.309	11.365	335.31	78.466
B	9023547661224262336	8:08:50.45 +33:37:6.04	12.46	12.07	11.54	-4.45	0.07	1.78	0.05	4.234	0.034	55.728	1.5845	55.982	-	-	-
A	5713838299478074496	8:10:54.02 -19:02:33.25	11.22	11.03	10.46	-20.07	0.05	9.57	0.03	2.693	0.032	30.032	0.70937	49.327	1.9691	332.03	39.615
B	5713838299478074368	8:10:53.96 -19:02:31.52	11.63	11.6	10.63	-20.47	0.07	10.11	0.04	2.712	0.049	29.619	0.19733	49.917	-	-	-
A	929690721132282496	8:13:37.40 +46:57:47.99	12.06	11.8	11.39	-7.13	0.05	-8.63	0.03	2.161	0.036	17.34	1.1201	30.044	4.6003	256.42	88.354
B	929690721132282752	8:13:36.96 +46:57:46.91	12.53	12.24	11.8	-7.24	0.05	-8.63	0.04	2.172	0.042	17.1	0.94992	30.033	-	-	-
A	5547988790189376512	8:16:7.40 -31:45:34.48	9.31	9.05	8.67	-45.58	0.04	1.96	0.04	6.307	0.031	23.21	0.54877	41.352	13.708	275.3	76.829
B	5547988790189380096	8:16:6.33 -31:45:33.22	14.41	13.82	12.76	-45.49	0.02	2.38	0.02	6.32	0.019	23.643	6.4608	41.553	-	-	-
A	928433051628684800	8:17:20.03 +44:37:16.55	12.58	12.29	11.86	-2.64	0.05	-4.05	0.05	1.512	0.042	71.929	6.0536	73.457	11.555	270.24	56.673
B	928433051628684928	8:17:18.95 +44:37:16.60	12.87	12.59	12.15	-2.51	0.05	-3.95	0.04	1.557	0.036	70.747	4.7813	72.204	-	-	-
A	5644525223912208000	8:17:44.92 -29:52:28.24	12.99	12.72	12.31	-8.32	0.03	11.93	0.03	1.371	0.026	83.689	2.6477	97.833	5.2752	236.23	30.992
B	5644525223912209536	8:17:44.59 -29:52:31.17	13.11	12.84	12.42	-8.96	0.03	11.29	0.03	1.351	0.026	83.765	3.0271	97.661	-	-	-
A	5527590478654239744	8:20:10.50 -40:40:47.76	11.52	11.19	10.74	-8.72	0.03	14.97	0.04	2.584	0.027	55.879	0.44166	64.269	11.685	307.7	13.882
B	5527590478660733184	8:20:9.68 -40:40:40.62	11.51	11.2	10.77	-7.78	0.05	12.68	0.04	2.596	0.033	55.599	0.41718	61.924	-	-	-
A	5751539934714473600	8:25:43.59 -10:30:28.15	10.11	9.84	9.44	-17.45	0.06	22.88	0.04	4.688	0.039	42.04	0.54285	51.037	18.808	323.13	75.828
B	5751540136576388736	8:25:42.83 -10:30:13.10	12.25	11.85	11.3	-17.11	0.05	22.86	0.04	4.737	0.036	42.622	1.0418	51.393	-	-	-
A	5277803044804767232	8:25:44.49 -62:26:26.81	12.27	11.86	11.31	-14.17	0.04	25.01	0.03	4.24	0.022	45.81	0.75191	55.893	3.8974	333.04	51.861
B	5277803044807372032	8:25:44.24 -62:26:23.34	12.53	12.1	11.53	-13.97	0.04	25.88	0.03	4.27	0.021	45.392	0.80741	55.981	-	-	-
A	664165157016098432	8:25:45.36 +21:08:51.08	11.98	11.8	11.49	-6.36	0.08	-5.25	0.04	1.635	0.053	33.158	2.2475	40.692	14.231	289.79	42.368
B	664165363174488320	8:25:44.40 +21:08:55.90	13.98	13.63	13.12	-6.17	0.07	-5.42	0.03	1.673	0.045	32.543	9.1761	40.135	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	5702779342803384064	8:29:45.83 -22:33:20.73	13.11	12.74	12.21	-10.08	0.05	1.33	0.04	2.044	0.035	112.36	3.377	116.06	22.899	234.45	105.27
B	5702779338507546624	8:29:44.49 -22:33:34.04	13.39	13.01	12.47	-10.21	0.03	1.21	0.03	2.053	0.026	111.38	1.2062	115.2	-	-	-
A	5723703427035644416	8:30:46.32 -13:11:28.55	12.98	12.37	11.64	28.75	0.05	30.7	0.04	6.789	0.032	89.17	1.1821	93.902	21.505	35.734	135.84
B	5723703427035642496	8:30:47.18 -13:11:11.10	13.93	13.15	12.3	28.93	0.03	31.67	0.02	6.772	0.02	89.126	2.0637	94.045	-	-	-
A	5271566756585414272	8:32:27.64 -68:27:44.53	12.08	11.79	11.3	9.49	0.05	-8.59	0.04	2.051	0.03	25.759	0.46893	39.389	2.4474	268.12	29.498
B	5271566752291026176	8:32:27.20 -68:27:44.61	12.54	12.26	11.78	9.97	0.06	-8.33	0.08	2.014	0.038	25.346	2.1469	39.461	-	-	-
A	3065531365627730176	8:33:51.84 -04:30:3.71	8.18	7.92	7.56	-60.34	0.07	15.45	0.05	10.885	0.043	71.438	0.21895	76.432	19.973	88.587	106.63
B	3065531365627729664	8:33:53.17 -04:30:3.22	14.53	13.51	12.5	-59.28	0.04	16.07	0.03	10.861	0.028	70.966	1.8131	75.857	-	-	-
A	5708706741267890816	8:34:54.84 -17:59:26.33	11.58	11.27	10.83	-29.6	0.06	11.97	0.08	3.769	0.047	67.619	0.5231	69.039	17.299	157.63	88.099
B	5708706736970404608	8:34:55.30 -17:59:42.33	13.83	13.18	12.42	-29.7	0.03	11.92	0.03	3.782	0.023	68.406	1.7865	69.816	-	-	-
A	917558331874056320	8:39:44.10 +45:45:30.01	12.11	11.7	11.12	-38.62	0.06	-30.97	0.04	5.411	0.042	26.566	1.2553	50.923	2.3061	94.439	70.408
B	917558327579272704	8:39:44.32 +45:45:29.83	13.2	12.68	11.95	-39.36	0.06	-30.82	0.05	5.386	0.049	26.865	0.93754	51.444	-	-	-
A	576047569577562880	8:44:14.14 -06:01:36.72	12.66	12.03	11.29	-49.52	0.06	-5.23	0.04	7.918	0.042	22.564	1.3336	37.386	3.7066	43.139	50.24
B	5760475695776013568	8:44:14.31 -06:01:34.02	12.73	12.09	11.34	-48.73	0.06	-6.15	0.04	7.923	0.044	22.717	0.5466	37.156	-	-	-
A	1041299981804743040	8:45:17.45 +60:43:27.01	10.8	10.36	9.79	-78.75	0.04	5.47	0.04	12.42	0.03	11.952	0.72951	32.474	7.9557	359.83	41.16
B	1041299981804742912	8:45:17.45 +60:43:34.97	13.97	13.04	12.08	-78.09	0.03	7.39	0.02	12.376	0.021	12.082	2.0186	32.345	-	-	-
A	1017070593819948672	8:47:16.59 +51:24:10.68	11.55	11.29	10.88	-7.23	0.06	3.89	0.05	2.201	0.039	12.064	0.64994	21.366	4.7189	312.1	17.935
B	1017070593819982880	8:47:16.22 +51:24:13.85	11.68	11.42	11.02	-6.8	0.07	4.22	0.07	2.206	0.048	11.883	0.97386	20.897	-	-	-
A	5272152452689785216	8:48:20.52 -66:48:15.75	12.97	12.44	11.8	44.78	0.04	-67.58	0.04	4.595	0.02	30.061	0.97998	176.71	6.1893	293.19	75.339
B	5272152452689784192	8:48:19.55 -66:48:13.31	13.88	13.23	12.47	45.42	0.02	-66.72	0.02	4.588	0.012	30.483	1.368	176.03	-	-	-
A	5301823319425748096	8:48:38.34 -59:31:27.22	10.74	10.42	9.97	2.01	0.07	-2.68	0.05	3.106	0.03	49.877	0.5528	50.136	13.951	95.192	75.031
B	5301823323727575552	8:48:40.17 -59:31:28.48	11.04	10.74	10.31	2.05	0.05	-2.95	0.04	3.135	0.026	49.357	0.34839	49.657	-	-	-
A	5761822292578577920	8:49:9.64 -04:19:19.04	13.42	12.56	11.65	-120.34	0.06	69.44	0.04	11.61	0.041	81.814	0.45048	99.659	7.6071	110.11	76.436
B	5761822292578577536	8:49:10.11 -04:19:21.66	14.2	13.2	12.21	-122.74	0.05	70.35	0.03	11.548	0.031	81.043	0.71259	99.627	-	-	-
A	5757106074889129216	8:49:58.40 -07:04:50.00	10.89	10.41	9.79	2.94	0.08	2.12	0.05	2.279	0.061	48.042	1.2033	48.606	6.6871	142.57	20.626
B	5757106074890209664	8:49:58.67 -07:04:55.31	11.72	11.33	10.82	2.11	0.11	1.32	0.04	2.372	0.058	48.181	0.26293	48.447	-	-	-
A	57789441238771136	8:50:55.54 +02:13:1.97	10.98	10.7	10.28	-29.2	0.07	-40.79	0.04	4.607	0.043	20.611	0.27623	55.283	2.4325	128.62	55.893
B	577894416682560896	8:50:55.66 +02:13:0.46	13.4	13.01	12.27	-28.32	0.17	-40.7	0.06	4.664	0.042	21.002	3.8164	54.88	-	-	-
A	6049207560912331744	8:51:17.04 +11:50:46.50	11.41	10.84	10.16	-11.15	0.06	-3.31	0.04	1.176	0.041	34.124	0.24591	56.961	22.768	295.28	20.914
B	604920962249663360	8:51:15.64 +11:50:56.23	13.22	12.78	12.19	-10.72	0.07	-2.78	0.05	1.244	0.043	34.347	1.5537	55.368	-	-	-
A	5761106815451107712	8:53:45.53 -04:36:36.51	12.67	12.17	11.54	-54.66	0.05	17.84	0.06	5.786	0.035	44.805	0.60404	64.979	8.5287	118.06	97.928
B	57610950668715946368	8:53:46.03 -04:36:40.52	13.14	12.58	11.89	-53.92	0.06	18.16	0.06	5.8	0.037	44.758	8.3663	64.591	-	-	-
A	5655819957091893632	8:54:40.04 -21:54:4.72	12.39	12.22	11.36	-9.21	0.05	5.56	0.04	1.362	0.033	44.628	1.0297	57.817	1.6191	300.85	96.131
B	5655819957093318912	8:54:39.94 -21:54:3.89	12.56	12.47	11.25	-9.19	0.05	5.4	0.04	1.415	0.035	44.869	1.257	57.789	-	-	-
A	5756550473624599296	9:02:57.45 -07:08:45.23	11.42	11.71	10.96	-11.85	0.06	5.35	0.05	1.771	0.042	39.748	1.6026	52.697	1.5031	200.61	24.38
B	5756550477919655296	9:02:57.42 -07:08:46.64	11.78	11.99	11.06	-11.7	0.07	4.56	0.06	1.797	0.046	39.618	3.1447	51.829	-	-	-
A	5635473253905994112	9:04:1.88 -29:56:0.16	11.02	10.7	10.24	-28.42	0.05	16.28	0.04	2.232	0.033	29.949	0.79979	76.492	12.462	337.04	43.386
B	5635473288265731456	9:04:1.51 -29:55:48.69	11.18	10.88	10.43	-27.92	0.12	15.64	0.08	2.156	0.057	30.006	5.4749	75.033	-	-	-
A	606879634839049472	9:04:45.80 +13:30:56.73	13.42	12.42	11.43	-67.12	0.06	-11.44	0.04	16.965	0.042	17.054	0.53816	25.571	3.6865	263.94	13.237
B	606879639134600448	9:04:45.55 +13:30:56.34	13.45	12.44	11.44	-60.63	0.06	-9.69	0.04	16.916	0.042	17.106	0.4972	24.245	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	5627868206856431616	9:05:50.31 -33:33:38.97	13.12	12.76	12.25	-36.73	0.03	2.34	0.04	2.539	0.027	49.156	1.0333	50.224	25.719	209.44	63.212
B	56278447391544045376	9:05:49.30 -33:34:1.37	13.91	13.48	12.9	-36.6	0.02	2.35	0.02	2.53	0.016	48.369	2.5576	49.446	-	-	-
A	519663404272523264	9:06:39.88 -80:35:8.54	12.11	11.66	11.07	-12.99	0.03	12.31	0.03	1.557	0.019	33.719	0.99054	63.888	4.1748	138.75	61.908
B	519663404272523520	9:06:41.00 -80:35:11.67	13.25	12.87	12.32	-12.75	0.04	12.47	0.03	1.572	0.021	34.268	2.6984	64.022	-	-	-
A	5203145006984991744	9:08:42.12 -78:22:16.08	12.3	11.89	11.3	-18.27	0.04	-31.09	0.03	3.773	0.021	22.054	0.89191	50.295	2.9948	182.93	40.551
B	5203145006984991232	9:08:42.07 -78:22:19.08	12.36	11.95	11.36	-17.43	0.04	-30.62	0.03	3.793	0.023	22.294	1.1614	49.472	-	-	-
A	5624560875880647808	9:10:5.40 -34:38:20.52	13.37	12.91	12.32	-3.97	0.03	22.92	0.04	3.475	0.024	52.044	1.3849	52.329	26.763	63.671	52.959
B	5624560841520906624	9:10:7.34 -34:38:8.65	13.65	13.17	12.54	-4.19	0.02	-0.4	0.02	3.463	0.016	52.987	1.5745	53.299	-	-	-
A	5298854741119591808	9:10:29.68 -62:04:55.69	13.03	12.54	11.91	3.02	0.04	22.92	0.04	3.888	0.023	63.12	1.0218	69.062	6.2882	340.9	61.929
B	5298854745413785088	9:10:29.39 -62:04:49.75	14.12	13.49	12.74	3.3	0.02	22.79	0.02	3.924	0.014	62.078	3.3121	68.066	-	-	-
A	5426862427433496448	9:11:25.99 -44:31:9.89	13.06	12.48	11.78	-6.56	0.04	3.56	0.04	1.347	0.028	41.433	1.4838	49.151	23.372	176.71	125.59
B	5426859476800019456	9:11:26.12 -44:31:33.22	13.21	12.82	12.29	-6.57	0.04	3.6	0.04	1.331	0.027	41.071	2.028	48.899	-	-	-
A	5424411104917942144	9:20:13.90 -43:17:45.68	11.29	10.83	10.23	-13.92	0.05	20.11	0.04	3.52	0.034	76.478	0.59961	83.162	5.3143	242.77	80.311
B	542441173637419392	9:20:13.47 -43:17:48.11	11.26	10.89	10.39	-13.92	0.06	20.15	0.05	3.581	0.036	75.449	0.64469	82.234	-	-	-
A	5633259692181436288	9:24:10.47 -29:46:0.26	12.06	11.69	11.17	7.81	0.05	-14.49	0.06	4.148	0.034	48.062	0.66203	51.598	3.0254	211.91	53.126
B	5633259692183858176	9:24:10.35 -29:46:2.83	12.15	11.78	11.24	7.75	0.06	-15.12	0.06	4.167	0.034	47.418	0.77819	51.223	-	-	-
A	5630135086296699904	9:27:9.07 -33:45:24.14	12.2	11.96	11.59	-12.85	0.02	1.67	0.04	1.56	0.025	24.21	1.3516	45.707	7.4083	36.784	70.375
B	5630135193675616384	9:27:9.42 -33:45:18.20	12.28	12.05	11.67	-13.01	0.03	1.68	0.04	1.611	0.027	24.654	1.091	46.349	-	-	-
A	700894510443458688	9:27:41.35 +31:48:0.14	12.51	12.25	11.84	-20.49	0.07	7.03	0.05	2.2	0.062	19.351	1.2536	50.519	17.867	159.61	53.446
B	700894510443458688	9:27:41.84 +31:47:43.40	12.61	12.35	11.93	-20.81	0.08	6.73	0.06	2.201	0.066	19.265	1.894	50.902	-	-	-
A	530746367821089920	9:30:13.47 -54:40:53.74	11.64	11.27	10.75	13.95	0.06	-12.61	0.07	2.972	0.035	16.517	0.92827	34.354	16.984	314.64	28.285
B	530746367821090048	9:30:12.07 -54:40:41.81	11.72	11.35	10.84	13.93	0.06	-11.86	0.06	2.947	0.035	16.51	0.71178	33.637	-	-	-
A	3825775005477214336	9:34:5.89 -02:53:8.95	12.29	11.99	11.44	-12.05	0.06	-8.29	0.06	3.25	0.039	103.06	1.8345	105.27	2.4505	210.56	137.39
B	3825775001182086400	9:34:5.80 -02:53:11.06	12.4	12.11	11.57	-11.83	0.06	-8.13	0.05	3.209	0.039	102.41	3.3354	104.55	-	-	-
A	5412606129614448768	9:38:12.61 -44:42:26.10	9.37	8.74	8.02	-20.71	0.05	7.63	0.05	2.974	0.031	13.821	0.29219	37.775	15.294	255.13	56.293
B	5412606125306558848	9:38:11.22 -44:42:30.02	13.01	12.6	12.05	-20.65	0.04	8.02	0.05	2.975	0.035	14.061	0.91666	37.985	-	-	-
A	5688834065026642944	9:41:3.39 -14:29:49.19	12.97	12.2	11.36	-65.75	0.05	11.56	0.04	10.424	0.037	54.978	0.34021	62.85	4.2187	274.85	38.414
B	5688834065026643200	9:41:3.10 -14:29:48.83	14.1	13.13	12.15	-67.4	0.05	8.9	0.05	10.359	0.037	55.803	0.93328	63.843	-	-	-
A	5425357402172042880	9:43:6.66 -41:32:57.30	12.08	11.86	11.27	-26.43	0.03	21.02	0.04	2.467	0.027	40.292	0.70735	76.03	1.7806	42.631	34.577
B	5425357406473125888	9:43:6.77 -41:32:55.99	13.13	12.94	12.35	-27.01	0.03	22.03	0.06	2.503	0.031	40.252	3.2565	77.774	-	-	-
A	5356423937309533696	10:03:1.49 -53:28:59.54	10.27	9.9	9.4	13.23	0.09	-1.81	0.07	6.226	0.04	116.53	0.85698	116.98	9.9948	179.08	44.907
B	5356423834230317568	10:03:1.51 -53:29:9.53	11.55	11.16	10.63	10.36	0.04	-2.9	0.04	6.195	0.028	117.69	0.71723	117.98	-	-	-
A	5414976711038842752	10:03:7.78 -44:01:20.26	12.09	11.8	11.37	-23.12	0.04	3.45	0.04	2.555	0.031	40.93	0.79577	59.283	17.243	260.78	126.16
B	5414976711038802944	10:03:6.20 -44:01:23.02	12.89	12.55	12.05	-23.11	0.04	3.43	0.04	2.612	0.03	40.464	1.5578	58.945	-	-	-
A	542019684848051584	10:08:5.96 -40:45:50.13	12.47	12.21	11.74	-9.75	0.03	0.37	0.03	1.312	0.025	36.976	1.8633	50.983	2.5201	330.5	31.281
B	5420196848483754368	10:08:5.85 -40:45:47.93	12.65	12.47	12.12	-9.31	0.03	0.43	0.04	1.326	0.027	36.773	6.3114	49.764	-	-	-
A	5472080289801721472	10:22:38.68 -25:50:24.75	13.1	12.47	11.73	-161.12	0.07	113.51	0.06	7.086	0.038	63.834	0.6231	146.68	6.0608	158.04	290.58
B	547208028980927232	10:22:38.84 -25:50:30.37	13.57	12.86	12.06	-161.39	0.06	113.91	0.06	7.064	0.038	63.446	0.387	146.78	-	-	-
A	3782526540232194304	10:31:42.43 -01:35:36.35	13.18	12.67	12.03	-79.51	0.08	-33.1	0.07	4.327	0.051	50.634	0.18825	107.26	6.862	53.161	117.81
B	3782526643311021952	10:31:42.80 -01:35:32.23	13.23	12.71	12.06	-79.8	0.08	-33.84	0.07	4.311	0.05	50.368	4.6871	107.67	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	5232898783766905984	10:38:42.26 -67:19:18.70	12.98	12.35	11.6	-11.56	0.04	4.41	0.04	1.584	0.022	17.265	4.1782	40.679	5.7409	328.35	18.989
B	5232898788079300608	10:38:41.74 -67:19:13.81	13.11	12.67	12.07	-12.19	0.04	4.04	0.04	1.601	0.022	17.231	2.8796	41.935	-	-	-
A	5232735437571068160	10:39:32.01 -68:24:35.71	12.17	11.84	11.36	-20.4	0.03	6.33	0.03	1.379	0.023	20.295	2.2857	76.577	11.993	344.76	58.544
B	5232735441881080704	10:39:31.44 -68:24:24.14	12.44	12.12	11.65	-20.7	0.04	6.11	0.04	1.363	0.024	20.57	2.9783	77.395	-	-	-
A	5471333038507489536	10:40:14.96 -24:19:8.92	11.51	11.15	10.51	-30.82	0.09	-2.66	0.06	7.046	0.05	18.113	0.57109	27.627	1.7919	167.29	20.341
B	5471333038507489408	10:40:14.99 -24:19:10.67	12.09	11.76	10.82	-32.6	0.22	-1.66	0.1	6.964	0.1	18.041	0.72294	28.461	-	-	-
A	5360756734660589696	10:41:45.49 -50:59:43.67	11.89	11.25	10.52	-104.21	0.04	45.71	0.04	13.602	0.03	15.025	0.55863	42.445	8.1976	276.15	55.215
B	5360759685296813184	10:41:44.63 -50:59:42.79	12.94	12.12	11.24	-106.37	0.04	45.21	0.04	13.577	0.03	15.057	0.58342	43.039	-	-	-
A	5391886382731897216	10:44:23.95 -41:04:40.71	11.56	11.24	10.76	-12.64	0.04	6.39	0.04	4.367	0.029	23.304	0.98606	27.922	2.8732	299.1	31.43
B	5391886382731897216	10:44:23.73 -41:04:39.31	13.37	12.91	12.21	-12.87	0.04	7.09	0.05	4.36	0.033	23.714	2.0505	28.583	-	-	-
A	8368161765255859408	10:47:55.71 +51:48:12.54	10.09	9.83	9.45	-34.96	0.05	-17.4	0.05	5.364	0.046	16.211	0.54631	38.329	16.193	121.06	70.304
B	83681617652558584896	10:47:57.21 +51:48:4.19	12.79	12.29	11.65	-35.45	0.04	-17.64	0.05	5.298	0.044	15.957	0.58249	38.664	-	-	-
A	5451485101278574080	10:51:50.99 -31:07:32.92	10.89	10.55	10.07	-36.7	0.1	8.43	0.08	3.934	0.069	62.55	0.31102	77.555	24.97	111.7	87.756
B	5451485032560881152	10:51:52.80 -31:07:42.16	12.09	11.65	11.06	-37.38	0.04	8.68	0.04	3.891	0.031	62.644	0.32429	78.151	-	-	-
A	5188831598973857664	10:52:42.40 -87:19:55.88	11.2	10.77	10.2	42.83	0.04	-51.03	0.04	9.332	0.031	31.871	0.57465	46.429	3.5755	111.94	25.908
B	5188831594678471168	10:52:47.15 -87:19:57.22	12.78	12.12	11.33	45.73	0.05	-49.15	0.07	9.38	0.034	31.498	1.2201	46.364	-	-	-
A	5363236884992905088	10:55:53.79 -47:44:10.20	12.43	12.02	11.46	9.62	0.04	-22.84	0.04	2.076	0.028	26.098	0.87766	62.004	6.9086	268	97.435
B	536323685036337024	10:55:53.11 -47:44:10.44	12.43	12.03	11.49	9.47	0.04	-22.76	0.04	2.102	0.028	25.595	0.89656	61.522	-	-	-
A	5397217021264519168	11:16:10.03 -37:24:21.18	11.35	10.97	10.46	-37.72	0.04	-19.4	0.04	5.784	0.036	13.649	0.31296	37.45	20.293	227.42	174.36
B	5397216986904779776	11:15:58.77 -37:24:34.91	12.27	11.81	11.2	-37.79	0.04	-19.38	0.03	5.753	0.031	13.856	0.64579	37.566	-	-	-
A	5399708544675901696	11:26:15.34 -33:38:27.19	11.5	11.12	10.61	-49.74	0.09	10.95	0.07	3.214	0.081	24.074	0.73148	48.301	11.377	232.1	114.71
B	5399709304886483968	11:26:14.62 -33:38:34.18	11.59	11.23	10.75	-49.5	0.05	10.93	0.04	3.182	0.044	23.704	0.34	47.947	-	-	-
A	5236627674379610880	11:31:47.46 -67:00:35.99	11.36	10.96	10.42	-4.07	0.06	-52.96	0.05	7.624	0.027	215.05	0.62499	217.56	19.045	42.858	44.422
B	523662713061078528	11:31:49.67 -67:00:22.03	14.01	13.24	12.39	-7.81	0.03	-50.28	0.02	7.648	0.016	219.09	4.3895	221.35	-	-	-
A	3540001762937115264	11:40:3.79 -23:27:57.60	13.56	13.2	12.68	-19.45	0.04	-11.26	0.02	1.605	0.025	39.771	2.517	77.887	3.8651	32.22	97.564
B	3540001762937115392	11:40:3.94 -23:27:54.33	13.96	13.59	13.05	-19.5	0.04	-11.48	0.02	1.576	0.026	39.338	4.6113	78.064	-	-	-
A	3972886320896657152	11:43:27.99 +16:40:57.17	11.36	11.01	10.53	-70.65	0.11	-2.34	0.09	6.171	0.072	9.5854	0.91554	55.585	26.701	305.04	127.82
B	3972886351350787456	11:43:26.47 +16:41:12.50	13.82	13.14	12.36	-71.15	0.04	-2.16	0.03	6.109	0.033	9.7305	2.8144	55.987	-	-	-
A	3479450798601860352	11:45:53.62 -30:51:8.53	11.21	10.47	9.66	-27.36	0.04	-21.53	0.03	23.69	0.039	28.326	0.22698	29.17	8.7832	253.31	54.698
B	3479449321133109760	11:45:52.96 -30:51:11.05	13.74	12.58	11.52	-25.72	0.05	-23.47	0.04	23.678	0.046	28.169	0.48974	29.018	-	-	-
A	5342175572286526464	11:49:28.12 -57:20:3.93	11.87	11.32	10.67	-3.72	0.04	-10.31	0.03	1.479	0.03	16.09	0.90441	39.292	4.2758	157.76	42.409
B	5342175572286525184	11:49:28.32 -57:20:7.89	12.5	12.06	11.47	-3.94	0.04	-10.14	0.03	1.423	0.027	16.256	1.0561	39.116	-	-	-
A	3463484133123106048	11:49:49.07 -37:21:44.88	12.5	11.95	11.28	-14.93	0.04	-2.14	0.03	1.693	0.037	26.693	0.54762	50.183	11.076	207.97	18.632
B	3463484137419740032	11:49:48.63 -37:21:54.67	13.27	12.91	12.4	-15.44	0.04	-2.96	0.02	1.677	0.033	27.008	2.4077	51.879	-	-	-
A	3479253264465967104	11:51:15.29 -31:24:15.34	12.36	11.75	11.02	-20.36	0.03	2.23	0.02	1.056	0.029	42.49	0.31918	100.86	4.1886	45.129	80.72
B	3479253260171927168	11:51:15.52 -31:24:12.39	13.62	13.13	12.48	-20.28	0.03	2.03	0.02	1.067	0.028	41.7	0.9435	100.12	-	-	-
A	5380031139126005120	11:51:30.92 -42:34:15.37	10.01	9.65	9.16	-29.72	0.05	2.5	0.04	6.426	0.043	45.863	0.25869	50.897	6.9058	112.07	80.345
B	538003107040753920	11:51:31.50 -42:34:17.97	12.7	12.15	11.46	-30.27	0.06	2.28	0.06	6.361	0.069	45.408	0.651	50.66	-	-	-
A	5378195916782250496	11:52:23.36 -45:06:1.18	11.35	10.93	10.37	-89.47	0.03	8.99	0.03	4.459	0.027	69.762	0.31357	118.03	10.089	211.97	76.979
B	5378195916782248960	11:52:22.85 -45:06:9.74	14.56	13.79	12.93	-89.03	0.02	8.08	0.02	4.487	0.018	70.862	1.7472	118.24	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	3571547576171990272	11:53:40.95 -15:36:18.53	8.28	7.98	7.56	23.36	0.09	-95.29	0.04	9.862	0.059	24.615	0.19309	53.371	13.045	224.92	38.516
B	3571547576171989888	11:53:40.31 -15:36:27.76	12.51	11.85	11.09	20.82	0.07	-94.1	0.03	9.792	0.048	24.377	0.54572	52.519	-	-	-
A	3466522564787326992	12:06:23.53 -32:17:13.94	12.67	12.33	11.83	1.94	0.05	-9.94	0.02	1.666	0.036	57.509	1.1899	64.22	14.29	1.8432	86.014
B	3466522569083819648	12:06:23.57 -32:16:59.66	13.27	12.95	12.47	1.79	0.04	-10.12	0.02	1.688	0.03	57.163	1.6739	64.101	-	-	-
A	1575932283835428096	12:09:28.64 +58:56:11.22	12.72	12.32	11.74	-85.83	0.03	-34.19	0.03	4.228	0.022	35.512	1.5021	109.13	2.652	77.498	67.129
B	1575932288130186240	12:09:28.98 +58:56:11.80	12.89	12.39	11.72	-85.87	0.17	-35.52	0.17	4.349	0.11	36.185	1.1667	109.92	-	-	-
A	3472525108000779904	12:14:17.12 -31:12:33.82	11.29	11.04	10.67	-20.85	0.07	3.9	0.06	2.717	0.048	5.1045	0.80273	37.164	14.998	333.08	85.042
B	347252510800808320	12:14:16.59 -31:12:20.45	12.07	11.78	11.34	-20.63	0.11	4.02	0.05	2.743	0.044	5.0935	0.58709	36.83	-	-	-
A	3946673593216154880	12:14:19.77 +17:11:46.08	11.03	10.61	10.05	-46.5	0.06	-35.3	0.04	4.034	0.044	20.225	0.40235	71.468	2.3293	317.58	26.109
B	3946673588921103744	12:14:19.66 +17:11:47.79	13.67	13.27	12.45	-44.21	0.42	-35.31	0.08	4.088	0.09	20.01	4.7191	69.38	-	-	-
A	6151556008794454400	12:26:1.63 -37:02:30.71	12.82	12.57	12.11	-16.2	0.05	-6.15	0.06	2.166	0.05	26.079	1.9524	45.358	2.3799	330.96	131.19
B	6151556008793276416	12:26:1.53 -37:02:28.63	13.1	12.82	12.34	-16.36	0.05	-6.13	0.06	2.261	0.05	26.11	1.7689	45.626	-	-	-
A	6128663283359017728	12:30:11.23 -47:56:42.18	11.33	11.04	10.61	-20.26	0.05	2.13	0.03	3.963	0.042	4.7798	0.47093	24.928	22.348	122.19	45.63
B	6128663180279802112	12:30:13.12 -47:56:54.09	13.49	13.01	12.38	-20.07	0.04	2.54	0.02	3.944	0.03	4.8251	1.2445	24.77	-	-	-
A	5843372485918189440	12:40:15.64 -70:12:25.51	11.9	11.45	10.74	-25.53	0.04	-8	0.04	4.705	0.026	59.406	1.3048	65.219	2.0126	61.824	22.116
B	5843372485904401024	12:40:15.99 -70:12:24.56	12.69	12.21	11.48	-26.75	0.04	-5.34	0.05	4.723	0.029	59.717	1.4944	65.72	-	-	-
A	3496384755139690496	12:40:38.67 -26:40:45.60	10.96	10.64	10.17	2.92	0.06	-30.22	0.06	4.139	0.047	29.277	0.37153	45.273	12.917	259.24	30.952
B	3496384716483400192	12:40:37.73 -26:40:48.01	13.94	13.36	12.64	4.01	0.05	-30.92	0.06	4.19	0.04	29.241	5.4768	45.963	-	-	-
A	5789117256423625600	12:44:35.01 -77:09:3.44	13.07	12.31	11.4	-86.5	0.04	18.43	0.03	4.348	0.025	18.35	0.80668	98.454	2.6139	151.37	78.599
B	5789117252126741632	12:44:35.39 -77:09:5.73	13.66	12.89	12	-85.54	0.04	19.04	0.03	4.322	0.024	18.263	1.3249	97.569	-	-	-
A	613242467271593592	12:47:21.34 -44:39:42.54	11.35	11.07	10.67	-6.68	0.07	-4.71	0.06	1.907	0.045	16.24	0.75033	25.879	5.7391	234.14	45.05
B	61324246737976599424	12:47:20.91 -44:39:45.90	12	11.74	11.33	-6.78	0.07	-4.88	0.06	1.941	0.046	16.557	4.315	26.424	-	-	-
A	6075032984505346432	12:52:59.08 -52:39:23.12	11.13	10.83	10.39	29.87	0.07	-0.76	0.09	2.739	0.081	19.954	0.16346	54.504	15.636	99.368	129.44
B	6075032988810712832	12:53:0.78 -52:39:25.66	12.48	12.15	11.67	30.05	0.07	-0.68	0.06	2.829	0.063	19.697	2.4545	54.692	-	-	-
A	6081344421765566208	12:57:2.71 -51:22:28.95	12.16	11.79	11.27	8.08	0.07	-6.87	0.05	2.369	0.038	22.846	1.1234	31.255	15.18	310.7	13.496
B	6081344421765565568	12:57:1.48 -51:22:19.05	12.45	12.09	11.58	7.07	0.07	-7.39	0.05	2.346	0.038	23.154	2.1276	30.971	-	-	-
A	6085434574960715008	13:12:19.63 -47:18:24.82	12.84	12.57	12.14	1.87	0.08	3.87	0.06	1.687	0.052	25.767	2.7486	28.519	7.2924	83.784	50.427
B	6085431620023216000	13:12:10.34 -47:18:24.03	12.97	12.7	12.27	1.95	0.08	3.69	0.06	1.649	0.051	25.838	5.4399	28.434	-	-	-
A	35111391317344441728	13:12:43.14 -17:54:37.30	11.56	11.59	10.78	-72.56	0.18	-46.27	0.14	2.738	0.114	45.52	1.3625	154.23	1.3212	339.82	43.401
B	3511139136030236160	13:12:43.11 -17:54:36.06	11.83	12.07	11.1	-74.53	0.7	-46.79	0.42	2.568	0.362	46.38	1.1403	157.66	-	-	-
A	5843895161940947328	13:19:11.50 -70:01:44.64	11.61	11.24	10.72	-10.76	0.04	-14.58	0.04	3.683	0.027	47.594	0.63679	52.933	26.632	142.26	33.013
B	5843895097541170816	13:19:14.68 -70:02:5.70	13.49	12.96	12.3	-11.79	0.03	-13.93	0.03	3.729	0.023	48.003	2.1465	53.373	-	-	-
A	606554854983053440	13:36:36.52 -54:19:35.11	9.44	8.79	8.05	10.16	0.1	-6.05	0.1	2.249	0.061	29.992	0.23656	39.143	10.062	262.32	59.486
B	606554850678450176	13:36:35.38 -54:19:36.45	11.05	10.69	10.18	9.95	0.1	-5.88	0.1	2.209	0.062	30.31	0.54818	39.026	-	-	-
A	6292151346615295872	13:47:28.30 -20:04:1.68	11.76	11.38	10.86	12.52	0.11	-18.32	0.14	4.076	0.053	19.639	0.53431	32.624	21.91	52.131	45.84
B	6292151380975033984	13:47:29.53 -20:03:48.23	13.27	12.75	12.1	12.71	0.1	-17.79	0.12	4.005	0.048	19.389	2.4791	32.169	-	-	-
A	3665918075066803840	13:51:15.50 +04:27:52.48	12.17	11.84	11.24	-13.68	0.08	-36.26	0.06	2.591	0.041	35.519	0.98806	78.546	2.0877	25.71	58.415
B	3665918109426542592	13:51:15.56 +04:27:54.36	12.71	12.59	11.81	-14.28	0.07	-36.69	0.05	2.655	0.042	35.748	1.659	79.644	-	-	-
A	6109629358390721664	14:01:38.75 -42:46:56.53	12.5	12.21	11.76	7.4	0.11	1.19	0.15	1.695	0.231	39.619	1.9158	41.871	12.548	61.961	35.482
B	6109629362688424704	14:01:39.76 -42:46:50.64	12.86	12.57	12.13	7.56	0.11	0.62	0.13	1.672	0.107	40.134	4.8255	42.411	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	3614686949246013696	14:03:37.45 -09:54:18.61	10.9	10.47	9.91	54.02	0.06	11.72	0.05	9.474	0.037	16.211	0.58274	32.025	2.7025	108.37	30.775
B	3614686949245327744	14:03:37.62 -09:54:19.47	13.27	12.59	11.66	53.57	0.06	13.75	0.05	9.502	0.037	16.156	1.4841	32.01	-	-	-
A	6277292065441190784	14:07:38.49 -21:39:20.05	9.68	9.13	8.46	14.68	0.1	-7.03	0.08	1.81	0.055	47.404	0.42209	63.907	21.364	283.42	25.334
B	6277292065441190656	14:07:37.00 -21:39:15.09	12.85	12.56	12.12	15.46	0.09	-7.59	0.07	1.796	0.052	47.818	1.479	65.904	-	-	-
A	6091473603920853120	14:15:24.99 -49:51:48.33	12.73	12.36	11.85	7.63	0.07	-6.15	0.07	2.857	0.041	40.165	2.2768	43.346	18.169	354.11	69.006
B	6091474364134856064	14:15:24.79 -49:51:30.25	14.6	14.03	13.33	7.79	0.08	-6.07	0.09	2.84	0.045	40.722	6.9503	43.911	-	-	-
A	5786628610637169920	14:21:53.33 -77:25:48.98	12.38	11.86	11.21	42	0.03	19.68	0.03	7.527	0.021	16.194	0.37355	33.424	4.9632	121.17	61.434
B	5786628614936850816	14:21:54.63 -77:25:51.55	14.06	13.26	12.38	42.2	0.02	18.9	0.02	7.518	0.016	16.39	1.7869	33.441	-	-	-
A	5895171990539248000	14:44:44.62 -51:47:1.18	13.23	12.8	12.22	-3.8	0.08	-12.33	0.12	2.969	0.045	25.908	2.1887	27.154	3.9427	103.64	107.39
B	5895172024898986752	14:44:45.03 -51:47:2.11	13.49	13.03	12.42	-3.42	0.06	-12.34	0.09	2.973	0.033	25.989	1.3134	27.214	-	-	-
A	1184663516243267584	14:49:40.69 +13:05:55.92	11.38	11.08	10.64	-45.98	0.07	-2.15	0.1	4.77	0.045	23.627	0.38658	51.567	26.356	48.42	106.86
B	11846635503006208	14:49:42.04 +13:06:13.41	11.4	11.09	10.65	-45.87	0.08	-2.29	0.11	4.741	0.056	24.076	1.497	51.683	-	-	-
A	5793341064698508032	14:56:5.85 -75:00:4.79	11.59	11.21	10.69	-3.41	0.03	-60.87	0.03	5.282	0.023	48.806	0.64899	73.333	13.358	228.6	105.68
B	57933410647001344	14:56:3.27 -75:00:13.63	12.1	11.68	11.12	-4.16	0.03	-61.06	0.03	5.28	0.022	48.8	0.45515	73.487	-	-	-
A	5881231248255581824	14:56:56.10 -56:38:31.94	10.88	10.46	9.91	-0.92	0.08	-6.51	0.08	4.526	0.037	72.78	0.77414	73.106	5.5257	105.18	115.28
B	5881231243932441984	14:56:56.75 -56:38:33.39	11.86	11.47	10.93	-1.28	0.08	-6.85	0.11	4.509	0.038	72.418	1.0149	72.787	-	-	-
A	5899810825781207424	14:57:32.23 -53:28:46.69	11.98	11.58	11.02	2.18	0.06	-28.7	0.06	5.003	0.036	35.902	0.94292	45.054	4.787	114.17	25.787
B	5899810825769625216	14:57:32.71 -53:28:48.65	12.12	11.71	11.15	3.48	0.06	-27.58	0.06	5.023	0.036	36.548	1.2099	45.021	-	-	-
A	579902893717108864	15:12:32.32 -70:13:23.29	11.88	11.46	10.9	-0.93	0.03	22.18	0.04	4.983	0.027	32.202	0.61825	38.455	2.8369	105.9	44.88
B	5799028941436539904	15:12:32.86 -70:13:24.07	13.69	13.11	12.32	-1.64	0.02	22.25	0.04	5.029	0.025	31.682	2.6155	38.078	-	-	-
A	5779911870200421888	15:35:59.22 -77:15:35.55	11.5	11.21	10.77	6.67	0.05	6.5	0.07	3.526	0.038	83.553	0.92005	84.474	21.508	290.62	70.942
B	5779911870200423680	15:35:53.13 -77:15:27.97	12.93	12.56	12.03	7.08	0.03	6.46	0.04	3.553	0.021	82.505	1.3384	83.493	-	-	-
A	600986258864478464	15:44:13.41 -36:36:37.89	12.21	11.67	10.98	12.86	0.13	-20.23	0.08	3.121	0.065	60.181	0.44543	70.567	29.785	254.17	72.688
B	600986293224217600	15:44:11.03 -36:36:46.01	12.78	12.24	11.56	13.41	0.07	-19.96	0.04	3.079	0.033	59.95	0.72228	70.431	-	-	-
A	4429532130374242944	15:46:0.96 +06:03:51.01	12.37	12.16	11.58	3.49	0.05	-15.48	0.05	2.747	0.036	22.518	3.5026	35.704	1.7728	296.87	26.343
B	4429532194797869824	15:46:0.86 +06:03:51.81	12.7	12.73	11.93	4.22	0.06	-15.76	0.05	2.68	0.039	22.463	2.2892	36.279	-	-	-
A	5768900394386414336	15:46:23.77 -82:59:45.95	9.44	8.76	8	-11.08	0.05	-16.66	0.06	2.084	0.035	25.821	0.16127	52.829	16.996	191.93	16.744
B	5768900394386415232	15:46:21.85 -83:00:2.58	12.66	12.3	11.78	-10.61	0.04	-17.97	0.04	2.038	0.029	25.77	1.1912	54.543	-	-	-
A	5768221858275172992	15:49:18.43 -84:03:17.17	11.56	11.01	10.35	8.45	0.03	12.93	0.03	2.593	0.022	50.633	0.44794	57.944	8.9556	117.41	16.206
B	5768221789554956416	15:49:13.55 -84:03:21.30	11.84	11.48	10.98	7.88	0.03	11.1	0.03	2.605	0.022	50.251	0.70362	56.051	-	-	-
A	5819158211901548928	15:50:42.59 -70:08:17.23	13.03	12.62	12.03	11.99	0.03	11.71	0.04	2.737	0.031	36.962	2.481	46.821	3.1213	68.213	120.6
B	5819158216200367744	15:50:43.16 -70:08:16.07	13.27	12.92	12.38	12.15	0.03	11.55	0.03	2.786	0.025	36.977	1.1306	46.837	-	-	-
A	6263059991235900800	16:03:37.41 -14:16:33.32	12.29	11.91	11.36	3.6	0.07	-11.07	0.03	1.769	0.035	70.638	0.61642	77.038	21.839	141.8	61.21
B	6263059991235897472	16:03:38.34 -14:16:50.48	12.84	12.5	11.98	3.56	0.09	-11.05	0.04	1.825	0.039	69.394	1.4961	75.866	-	-	-
A	5809060640706292864	16:26:1.07 -68:14:48.91	12.41	11.91	11.27	3.66	0.03	-5.47	0.03	1.775	0.025	36.815	0.44626	40.848	17.63	197.31	151.39
B	580906064017384448	16:26:0.13 -68:15:5.74	12.78	12.3	11.67	3.7	0.03	-5.49	0.04	1.748	0.028	36.574	1.0441	40.677	-	-	-
A	1653673532648879104	16:34:17.93 +71:55:56.78	11.28	10.98	10.55	-7.17	0.04	-1.02	0.05	3.626	0.021	41.27	0.73871	42.345	24.517	300.36	9.2001
B	1653685283680804864	16:34:13.38 +71:56:19.17	11.71	11.39	10.93	-5.9	0.03	2.2	0.04	3.616	0.02	40.757	0.78802	41.583	-	-	-
A	5928067660463377152	16:36:22.92 -57:16:19.21	11.17	10.51	9.76	10.79	0.05	-6.86	0.04	1.197	0.034	29.304	0.62648	58.628	28.837	212.27	11.444
B	5928067553054380032	16:36:21.02 -57:16:43.60	12.48	12.18	11.73	9.58	0.05	-6.57	0.04	1.188	0.038	29.118	1.7175	54.554	-	-	-



New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	593119851549461840	16:36:47.90 -51:53:39.02	12.86	12.19	11.42	30.46	0.06	-10.65	0.04	9.189	0.045	39.051	0.53305	42.449	10.022	346.29	88.095
B	5931198588598960256	16:36:47.64 -51:53:29.29	12.94	12.25	11.46	29.94	0.06	-10.06	0.04	9.196	0.045	39.312	0.9757	42.563	-	-	-
A	5830572998022025936	16:38:45.24 -61:00:12.47	13.25	12.76	12.06	5.3	0.05	-8.17	0.06	1.093	0.048	14.692	0.87732	44.798	2.3937	17.436	92.78
B	5830573002341392000	16:38:45.34 -61:00:10.19	13.24	12.86	12.3	5.29	0.05	-8.07	0.06	1.104	0.059	14.894	1.1063	44.499	-	-	-
A	5939978940469794560	16:50:31.48 -46:56:58.62	12.35	11.91	11.3	-12.53	0.07	-4.94	0.05	2.891	0.042	44.599	1.5294	49.731	2.6096	102.79	55.465
B	5939978944765475584	16:50:31.72 -46:56:59.20	12.57	12.16	11.55	-12.83	0.08	-5.4	0.06	2.919	0.048	44.54	0.7772	50.01	-	-	-
A	6032640355962847744	16:53:52.68 -29:04:42.21	10.6	10.3	9.87	3.2	0.07	-9.25	0.04	4.156	0.042	21.562	0.61095	24.251	4.1175	140.68	17.908
B	6032640355962845696	16:53:52.88 -29:04:45.40	11.75	11.38	10.88	4.25	0.15	-9.8	0.07	4.243	0.081	21.341	1.1068	24.54	-	-	-
A	5977806847749391360	16:56:9.07 -35:10:47.55	12.76	12.05	11.23	3.48	0.1	-14.39	0.06	2.763	0.056	37.731	0.78282	45.563	15.699	59.675	97.404
B	5977806847752923904	16:56:10.17 -35:10:39.62	13.45	12.72	11.9	3.38	0.09	-14.33	0.05	2.734	0.056	38.155	1.2879	45.836	-	-	-
A	4333475255519270656	16:58:15.37 -11:39:4.76	12.97	12.5	11.86	-23.79	0.06	-67.19	0.04	3.06	0.041	82.755	1.8174	138.51	4.6172	33.39	459.83
B	4333475251221489408	16:58:15.55 -11:39:10.90	13.59	13.08	12.42	-23.72	0.04	-67.01	0.02	3.041	0.025	82.753	4.051	138.26	-	-	-
A	5767962137308556288	17:00:3.60 -83:05:16.15	9.81	8.9	8	1.44	0.04	-1.4	0.05	1.177	0.027	19.725	0.26108	21.326	4.8545	183.83	22.834
B	5767962137306315648	17:00:3.42 -83:05:21.00	12.32	11.71	10.96	1.31	0.05	-1.59	0.05	1.173	0.027	19.855	1.0007	21.526	-	-	-
A	439111564077927168	17:03:46.83 +03:02:20.14	12.93	12.56	12.03	16.39	0.07	2.15	0.05	2.536	0.033	59.18	1.4074	66.94	10.924	305.74	533.78
B	439111564077926912	17:03:46.24 +03:02:26.52	13.23	12.85	12.3	16.44	0.07	2.11	0.05	2.472	0.035	59.148	1.7898	66.951	-	-	-
A	5950394785918358784	17:19:30.34 -49:20:49.05	11.66	11.38	10.95	0.26	0.07	-12.18	0.06	2.733	0.041	41.926	5.2092	46.855	17.233	261.54	72.271
B	5950394751558620544	17:19:30.59 -49:20:51.58	12.02	11.72	11.27	0.22	0.07	-12.16	0.06	2.791	0.043	42.574	1.6259	47.42	-	-	-
A	454888580039016832	17:40:14.72 +15:53:18.59	11.27	11.03	10.67	3.81	0.04	-6.02	0.05	3.024	0.03	17.551	0.70314	20.839	17.014	301.62	48.312
B	454888786197446784	17:40:13.71 +15:53:27.51	12.67	12.34	11.85	3.79	0.04	-6.29	0.05	2.989	0.029	17.481	0.91783	20.969	-	-	-
A	4499198767657675136	17:46:44.92 +12:48:21.18	12.44	12.17	11.68	5.98	0.05	-11.26	0.05	1.881	0.033	28.627	0.99717	42.659	2.3629	359.56	69.58
B	4499198763361274752	17:46:44.91 +12:48:23.54	13.05	12.79	12.09	5.85	0.05	-11.21	0.05	1.941	0.033	28.125	3.387	42.13	-	-	-
A	58098360334104320	17:51:22.68 -71:05:4.09	13.62	12.74	11.83	-27.66	0.03	40.15	0.04	10.957	0.025	41.695	1.1011	127.93	5.8375	208.91	26.744
B	58098360334104192	17:51:22.10 -71:05:9.20	14.2	13.21	12.23	-28.81	0.02	41.74	0.03	10.953	0.019	41.865	1.4447	132.6	-	-	-
A	4494963036554093440	17:54:51.15 +10:42:47.54	9.91	9.59	9.15	1.99	0.08	-40.8	0.08	5.278	0.043	14.891	0.99773	39.501	25.183	150.33	94.078
B	449496303255247744	17:54:52.00 +10:42:25.66	10.3	9.98	9.53	2.4	0.08	-40.89	0.08	5.308	0.043	14.704	0.49126	39.524	-	-	-
A	4488411252923656576	17:55:20.42 +08:38:11.94	13.08	12.84	12.04	0.6	0.06	-0.17	0.06	2.249	0.04	30.008	0.68068	30.037	3.9948	136.31	54.592
B	4488411252923655552	17:55:20.61 +08:38:19.05	13.48	13.04	12.43	0.81	0.04	-0.32	0.03	2.214	0.024	30.029	3.1858	30.087	-	-	-
A	4275203406997785728	18:08:11.29 -00:17:17.98	11.74	11.05	10.26	-210.26	0.07	-149.42	0.07	16.665	0.043	21.107	0.35732	76.443	2.984	94.633	87.685
B	4275203406997785344	18:08:11.49 -00:17:18.22	14.51	13.57	12.42	-210.5	0.07	-152.18	0.08	16.617	0.048	20.731	1.1305	76.834	-	-	-
A	4035998639481417600	18:09:40.21 -38:23:31.64	11.37	10.6	9.78	29.26	0.08	16.89	0.07	21.209	0.055	23.26	0.85902	24.458	14.332	150.93	24.459
B	4035998643322978304	18:09:40.80 -38:23:44.16	11.62	10.8	9.95	26.91	0.1	20.55	0.08	21.178	0.051	23.512	0.31855	24.702	-	-	-
A	4097308129341297024	18:19:1.73 -17:24:14.04	12.79	12.25	11.58	-14.73	0.08	-7.35	0.07	2.279	0.058	9.7236	0.92737	35.224	7.2192	184.02	52.102
B	4097308125034472704	18:19:1.70 -17:24:21.24	12.95	12.43	11.77	-14.51	0.08	-7.11	0.07	2.322	0.048	9.7569	1.837	34.634	-	-	-
A	4591557984912775680	18:22:18.18 +31:15:13.63	11.7	11.38	10.91	18.68	0.03	7.19	0.03	2.089	0.022	32.056	0.60304	55.757	2.5177	111.07	63.984
B	4591557984909394560	18:22:18.37 +31:15:12.72	13.1	12.87	12.37	18.96	0.04	7.13	0.05	2.064	0.029	31.477	3.4329	55.878	-	-	-
A	4485561971624947200	18:23:38.56 +14:10:19.00	12.77	12.39	11.86	-1.73	0.05	-8.13	0.06	1.64	0.031	35.26	0.94002	42.811	22.491	16.005	68.374
B	4485561971624950784	18:23:38.99 +14:10:40.62	12.88	12.52	12	-1.77	0.05	-8.17	0.06	1.605	0.032	35.868	1.128	43.391	-	-	-
A	4259599580350111104	18:38:4.00 -02:32:54.31	11.57	11.13	10.56	-2.82	0.08	-25.87	0.08	4.845	0.056	15.985	0.38395	30.052	26.304	26.39	19.837
B	4259599614709849216	18:38:4.78 -02:32:30.75	12.55	11.96	11.25	-4.05	0.08	-24.98	0.08	4.848	0.06	15.79	0.45939	29.355	-	-	-

New Binaries Found Using Data from the Gaia DR2 Catalog

Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	6762094818349709440	18:55:23.52 -28:01:2.32	12.13	11.62	10.91	-9.86	0.06	-5.65	0.06	2.678	0.039	88.255	4.7964	90.532	1.96	191.52	64.879
B	6762094818338941568	18:55:23.49 -28:01:4.24	12.34	12.03	11.12	-9.94	0.09	-5.65	0.07	2.655	0.047	89.654	1.5274	91.924	-	-	-
A	6434949942534819840	18:59:33.47 -66:09:8.95	11.11	10.73	10.21	-23.99	0.03	5.69	0.04	6.396	0.03	55.952	0.46436	58.858	16.81	310.73	96.319
B	6434949938237995648	18:59:31.37 -66:08:57.98	12.64	12.11	11.44	-23.27	0.02	5.34	0.03	6.401	0.028	56.099	0.70431	58.821	-	-	-
A	6632237409850522112	19:00:16.33 -60:54:5.87	10.87	10.52	10.04	-24.33	0.04	-0.18	0.04	7.133	0.034	55.498	0.47491	57.796	10.433	29.193	85.443
B	6632237512929736960	19:00:17.03 -60:53:56.77	11.55	11.14	10.6	-24.5	0.05	-0.49	0.05	7.168	0.039	56.137	0.79017	58.442	-	-	-
A	6420061661741324544	19:17:10.99 -71:09:45.37	9.58	9.3	8.89	-26.97	0.03	30.47	0.04	7.071	0.027	54.431	0.17281	60.906	25.933	54.228	89.216
B	6420061661741322368	19:17:15.34 -71:09:30.21	11.09	10.72	10.22	-26.51	0.03	30.29	0.03	7.05	0.023	55.03	0.27476	61.312	-	-	-
A	2046133934635629184	19:19:48.36 +32:52:26.02	11.56	11.24	10.78	-19.68	0.05	-0.56	0.06	3.174	0.034	56.917	0.77292	63.999	11.169	199.53	62.731
B	2046133930328862208	19:19:48.06 +32:52:15.49	12.62	12.27	11.76	-19.06	0.05	-0.63	0.05	3.206	0.035	57.341	1.258	63.965	-	-	-
A	6639245349071211136	19:23:5.24 -57:18:36.35	12.02	11.73	11.29	0.38	0.06	2.07	0.04	1.659	0.05	68.1	1.2919	68.354	10.511	246.69	17.593
B	6639245353368321024	19:23:4.04 -57:18:40.51	13.56	13.2	12.68	-0.93	0.04	2.44	0.02	1.709	0.031	67.425	1.1802	67.82	-	-	-
A	6645781365878877056	19:47:51.88 -51:31:19.35	12	11.47	10.82	-5.1	0.05	11.81	0.04	2.43	0.04	23.425	0.43657	34.45	6.9895	266.63	91.536
B	6645781361584410496	19:47:51.14 -51:31:19.76	12.48	12.13	11.63	-5.07	0.06	11.76	0.05	2.396	0.043	23.069	1.2272	34.125	-	-	-
A	6416084487665251200	19:51:30.58 -72:55:40.30	12.02	11.59	11.02	9.83	0.04	20.26	0.05	6.452	0.042	25.869	1.0592	51.229	6.8233	5.7041	29.964
B	6416085243579495168	19:51:30.73 -72:55:33.51	13.86	13.16	12.35	10	0.02	19.42	0.03	6.446	0.025	25.721	1.3002	50.013	-	-	-
A	6693422070839148544	20:19:57.16 -37:45:12.52	12.35	11.98	11.44	19.49	0.06	8.73	0.04	4.115	0.038	24.326	0.7984	34.699	2.5408	267.06	130.04
B	6693422070837609728	20:19:56.94 -37:45:12.65	12.69	12.3	11.72	19.29	0.06	8.63	0.04	4.068	0.038	24.266	2.1451	34.473	-	-	-
A	1805937025306422912	20:26:43.46 +16:46:6.27	12	11.66	11.17	-17.06	0.08	-3.93	0.06	3.429	0.055	14.25	1.1284	28.3	17.184	208.66	97.831
B	1805937029606780416	20:26:42.89 +16:45:51.19	12.25	11.89	11.39	-17.18	0.05	-4.09	0.04	3.38	0.035	14.172	1.1878	28.446	-	-	-
A	634662627257713024	20:32:39.46 -83:06:20.52	12.97	12.46	11.81	-17.91	0.03	9.53	0.03	3.011	0.021	79.04	0.71501	84.762	4.9436	301.99	11.798
B	6346626276553035136	20:32:37.13 -83:06:17.90	13.35	12.77	12.04	-16.22	1.23	14	1.4	2.557	0.752	79.043	1.524	85.401	-	-	-
A	646963964163570432	20:45:41.83 -55:41:34.44	12.89	12.61	12.17	-8.95	0.07	-6.1	0.07	1.545	0.052	38.719	3.3538	42.028	3.0716	164.94	22.507
B	646963964163570304	20:45:41.92 -55:41:37.40	13.33	12.99	12.48	-9.85	0.06	-5.26	0.06	1.533	0.04	38.526	2.1332	42.05	-	-	-
A	688677159629626496	20:57:0.78 -12:41:38.02	11.81	11.37	10.8	-37.06	0.07	-54.31	0.04	6.897	0.052	25.763	0.84452	52.02	7.3459	342.13	112.82
B	688677262708841728	20:57:0.62 -12:41:31.03	12.39	11.87	11.23	-36.5	0.07	-54.64	0.04	6.897	0.053	25.651	0.8963	51.94	-	-	-
A	6886715248632434944	20:57:5.05 -14:53:7.81	12.31	12.05	11.65	-5.6	0.06	-7.41	0.04	1.666	0.038	21.727	1.5491	34.186	15.962	48.506	80.675
B	6886715252928439680	20:57:5.88 -14:52:57.23	12.91	12.64	12.21	-5.56	0.06	-7.44	0.04	1.673	0.039	22.128	1.161	34.442	-	-	-
A	6463457461542412672	21:23:18.78 -54:29:15.30	10.08	9.77	9.33	-69.84	0.04	17.02	0.04	8.365	0.028	39.74	0.20573	56.932	14.654	359.4	67.438
B	6463457457246399744	21:23:18.76 -54:29:0.65	12.63	12.05	11.35	-68.58	0.03	17.76	0.03	8.355	0.026	39.888	0.86702	56.615	-	-	-
A	6452166164320196096	21:33:22.28 -60:24:19.12	10.57	10.08	9.46	63.5	0.04	-37.58	0.04	13.252	0.03	31.703	0.43565	41.229	9.6065	347.89	44.113
B	6452166160024770688	21:33:22.01 -60:24:9.73	13.38	12.39	11.42	65.26	0.05	-35.79	0.04	13.291	0.031	31.981	0.566	41.589	-	-	-
A	6571874633801591296	22:01:29.79 -40:25:1.51	12.68	12.38	11.93	1.62	0.04	-11.81	0.04	1.979	0.033	51.061	1.2381	58.303	10.342	161.42	60.235
B	6571874633801591040	22:01:30.08 -40:25:11.31	12.7	12.4	11.95	1.49	0.04	-11.6	0.04	2.037	0.033	51.838	1.2442	58.732	-	-	-
A	63957832767511168	22:06:34.11 -70:01:7.85	12.78	12.68	11.73	2.1	0.03	-7.94	0.03	1.522	0.022	64.976	1.3839	69.918	1.5444	224.69	78.74
B	6395783276765963648	22:06:33.89 -70:01:8.95	12.9	12.7	11.83	2.27	0.03	-8.06	0.03	1.495	0.021	64.379	2.068	69.553	-	-	-
A	6573544512788903552	22:08:36.44 -39:00:10.19	11.38	11.11	10.7	-26.11	0.06	-1.65	0.07	3.865	0.052	38.453	0.45565	49.913	19.666	222.9	78.18
B	6573544462726466432	22:08:35.29 -39:00:24.60	12.14	11.82	11.35	-26.31	0.05	-1.64	0.05	3.924	0.046	39.048	1.8786	50.526	-	-	-
A	6612398028195002112	22:12:16.38 -31:42:7.57	10.21	9.73	9.12	10.12	0.05	-23.89	0.06	2.843	0.04	25.708	0.21729	50.696	25.309	116.25	107.52
B	661239943694474048	22:12:18.15 -31:42:18.76	11.99	11.72	11.31	10.2	0.05	-23.81	0.05	2.788	0.039	25.278	1.1574	50.417	-	-	-

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Cmpnt	Unique source Id	Epoch 2015.5	mb	mg	mr	PM r	PM te	PM d	PM de	Px	Px e	RV	RV e	SV	rbo	theta	SV / dSV
A	1955552112276887296	22:12:43.03 +38:49:22.19	11.64	11.5	10.88	-13.9	0.04	-23.81	0.05	3.816	0.044	43.361	0.69474	55.152	1.6031	357.96	14.393
B	1955552112280975488	22:12:43.03 +38:49:23.79	11.9	11.94	11.14	-13.51	0.05	-26.87	0.06	3.856	0.046	42.638	1.1016	56.571	-	-	-
A	6407914360355718784	22:14:48.79 -59:54:33.09	11.84	11.53	11.09	-7.89	0.04	-2.11	0.05	2.131	0.038	41.354	0.59552	45.067	16.374	137.19	18.577
B	6407914356060458112	22:14:50.27 -59:54:45.10	12.66	12.39	11.87	-6.96	0.04	-2.56	0.06	2.196	0.042	40.594	0.9643	43.731	-	-	-
A	6407914360355718784	22:14:48.79 -59:54:33.09	11.84	11.53	11.09	-7.89	0.04	-2.11	0.05	2.131	0.038	41.354	0.59552	45.205	16.191	127.41	59.24
B	6407914360355718400	22:14:50.50 -59:54:42.92	12.23	11.94	11.47	-7.75	0.03	-2.42	0.04	2.113	0.036	41.42	1.1843	45.222	-	-	-
A	2736332876987176704	22:27:48.21 +15:54:22.19	10.48	10.17	9.73	-26.35	0.08	-13.87	0.08	6.607	0.059	9.5439	0.89986	23.25	7.2443	326.7	53.522
B	2736332945706653568	22:27:47.93 +15:54:28.25	11	10.66	10.18	-25.94	0.07	-14.24	0.08	6.72	0.069	9.7276	0.59989	23.205	-	-	-
A	2736592567889938432	22:33:8.70 +16:18:54.04	12.45	12.11	11.62	-23.68	0.06	-29.31	0.06	2.521	0.048	29.905	0.89237	76.665	12.386	344.29	186.8
B	2736592563594080896	22:33:8.46 +16:19:5.97	12.7	12.36	11.86	-23.65	0.06	-29.28	0.06	2.539	0.046	30.307	1.4831	76.75	-	-	-
A	6593919051662743040	22:34:52.92 -39:23:4.25	11.74	11.11	10.39	-94.3	0.06	-150.81	0.06	14.033	0.047	32.029	0.50713	67.934	8.2889	66.574	43.14
B	6593919051662742912	22:34:53.57 -39:23:0.95	13.96	12.91	11.9	-96.78	0.22	-154.75	0.25	14.254	0.185	31.77	1.5918	69.201	-	-	-
A	6519065605714754816	22:38:51.97 -47:01:52.35	11.89	11.54	11.04	-32.32	0.04	13.84	0.04	3.784	0.037	20.687	0.72775	48.719	3.4916	169.39	54.528
B	6519065605714754688	22:38:52.03 -47:01:55.79	13.34	12.88	12.23	-32.95	0.04	13.5	0.04	3.769	0.042	20.683	1.7976	49.228	-	-	-
A	2630569616560677504	23:16:59.15 -07:51:57.79	11.72	11.39	10.91	-4.4	0.08	-33.63	0.07	3.849	0.055	16.789	1.1258	45.008	27.276	336.83	52.154
B	2630569680985169024	23:16:58.43 -07:51:32.71	12.33	12.02	11.42	-3.86	0.08	-34.06	0.08	3.867	0.069	16.621	0.77987	45.36	-	-	-
A	6378374125048999424	23:20:50.84 -75:46:17.89	10.46	10.09	9.6	-42.03	0.04	-10.75	0.04	9.183	0.03	39.785	0.68568	45.673	27.331	104.57	55.381
B	6378374052033939024	23:20:58.02 -75:46:24.76	13.35	12.56	11.71	-41.17	0.04	-10.71	0.05	9.156	0.027	40.484	1.5375	46.074	-	-	-
A	2433610834502223872	23:32:21.76 -11:09:17.19	9.77	9.2	8.52	-4.44	0.09	-48.53	0.06	3.401	0.044	21.758	0.17998	71.403	9.4357	141.9	92.492
B	2433607875269803776	23:32:22.15 -11:09:24.61	12.42	12.07	11.56	-3.97	0.09	-48.26	0.06	3.388	0.05	21.616	1.7135	70.948	-	-	-
A	2331130299183935360	23:35:40.81 -27:52:15.81	12.74	12.32	11.73	-18.03	0.08	-10.39	0.08	4.473	0.06	19.589	1.7556	29.384	2.8535	63.048	38.042
B	2331130303478904320	23:35:41.00 -27:52:14.52	13.11	12.66	12.02	-18.74	0.09	-10.33	0.08	4.538	0.062	19.387	2.0692	29.716	-	-	-
A	1938879560334501632	23:37:47.31 +45:41:12.09	13.22	12.71	12.04	16.62	0.03	-25.58	0.03	4.818	0.028	24.994	1.2399	38.93	2.7921	292.03	66.412
B	1938879564633627136	23:37:47.07 +45:41:13.13	13.33	12.8	12.12	16.31	0.03	-25.37	0.03	4.87	0.026	24.541	1.0613	38.382	-	-	-
A	6352344733449704192	23:53:45.15 -80:42:51.08	11.57	11.2	10.68	59.18	0.05	-0.52	0.04	4.291	0.027	36.513	0.82478	74.689	3.5423	81.054	99.314
B	6352344733449703936	23:53:46.60 -80:42:50.53	13.82	13.3	12.56	58.68	0.03	-0.34	0.04	4.314	0.02	36.046	2.5749	73.98	-	-	-