

New Binary Systems from Data of Gaia DR2

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Abstract: The author describes the discovery of 4 new pairs of stars with almost identical proper motions and parallaxes (from Gaia DR2 data).

During the search for missed outbursts of cataclysmic variable stars, I found new stars with visible proper motions in images from the Digitized Sky Survey (DSS). I found 4 pairs of stars with almost identical proper motions and parallaxes from the data of Gaia DR2 (Gaia Collaboration et al., 2018). It almost certainly indicates they are gravitationally bound. There is no information about these stars in past issues of the JDSO and in SIMBAD or in the VizieR catalogs of double stars or of stars with high proper motions.

Table 1 (next page) shows the information (names added for abbreviations in this paper, RBS means “Romanov – binary system”) about these stars (from Gaia DR2, sorted by right ascension): id – unique source identifier; RA – barycentric right ascension at Epoch = 2015.5; RA er – error of RA, millisecond of arc (mas); DE – barycentric declination at Epoch = 2015.5; DE er – error of DE, mas; Plx – absolute stellar parallax, mas; Plx er – standard error of parallax, mas; pmR – proper motion in right ascension direction, mas/yr; pmR e – standard error of pmR, mas; pmD – proper motion in declination direction, mas/yr; pmD e – standard error of pmD, mas/yr; G mag – G-band mean magnitude.

RBS 1A – RBS 1B is the closest pair among those mentioned in this paper. Stars RBS 3A and RBS 3B are present in the catalog of white dwarfs (Fusillo et al., 2019) therefore, most likely, they are a binary system of white dwarfs.

References

- Gaia Collaboration et al., 2018, *Astronomy & Astrophysics*, **616**, A1.
Gentile Fusillo et al., 2019, *Monthly Notices of the Royal Astronomical Society*, **482**, 4570-4591.

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Table 1. Information about four pairs of stars from Gaia DR2.

Name	RBS 1A	RBS 1B	RBS 2A	RBS 2B	RBS 3B	RBS 3A	RBS 4A	RBS 4B
id	3058016822133524480	3058016822128695296	3048609087110484480	3048609091409752832	6065382021191694848	6065382021191695104	4126306649019342720	4126306649001765760
RA	109.42080407456	109.42105417528	109.74350321881	109.74407846527	204.82866809402	204.83342065405	254.36277171202	254.36346389038
RA er	0.0952	0.2386	0.0347	0.0655	0.1991	0.1885	0.0566	0.0913
DE	-06.77789155663	-06.77783089737	-08.349334877282	-08.34940354930	-54.82734656238	-54.82715314856	-21.68766640292	-21.68656443809
DE er	0.1082	0.2789	0.0379	0.0676	0.2231	0.2123	0.0367	0.0581
Plx	4.9279	5.0536	5.5013	5.4496	13.7966	13.8552	8.8331	8.6609
Plx er	0.1183	0.1714	0.0507	0.0866	0.2485	0.2347	0.0676	0.1065
pmR	-33.825	-33.383	-65.400	-64.764	-7.570	-8.419	-91.116	-91.163
pmR e	0.197	0.470	0.075	0.147	0.493	0.467	0.119	0.190
pmD	-42.465	-42.452	-37.807	-37.800	-92.137	-92.395	-89.127	-90.831
pmD e	0.206	0.498	0.072	0.143	0.544	0.518	0.069	0.107
G mag	16.4721	17.4292	15.3856	16.5317	18.7468	18.6777	15.5139	16.6666