INTERNATIONAL ASTRONOMICAL UNION

COMMISSION G1 (BINARY AND MULTIPLE STAR SYSTEMS)

DOUBLE STARS INFORMATION CIRCULAR No. 188 (FEBRUARY 2016)

NEW ORBITS

ADS α2000δ	Name n	P a	T i	e ω	Ω(2000) Last ob.	2016 2017	Author(s)
- 01477-4358	I 52 1°6079	223^{y}9 0″372	1969.74 150°4	0.847 12°5	20°9 2015.9131	207°3 0″516 206.9 0.522	DOCOBO et al. (*)
1833 02257+6133	STF 257 0.6461	557. 0.621	1934.00 43.8	0.588 165.8	142.4 2007.6021	78.0 0.453 78.8 0.458	DOCOBO & LING
2177 02512+0141	A 2338 2.0000	180.00 0.308	2005.98 38.3	0.736 119.3	157.3 2015.9103	15.2 0.158 19.1 0.165	DOCOBO et al. (*)
2464 03189-0101	BU 1177 1.3931	258.4 0.494	1903.10 120.2	0.268 16.3	16.2 2015.7435	194.9 0.619 194.5 0.620	DOCOBO et al. (*)
- 04142-4608	RST 2338 9.9092	36.33 0.296	1993.01 55.6	0.011 166.0	136.9 2015.9132	157.0 0.267 164.4 0.247	DOCOBO et al. (*)
- 05140+5126	HU 821 2.5536	140.98 0.653	1971.26 40.5	0.616 312.9	53.9 2012.7706	171.5 0.759 172.6 0.768	DOCOBO &CAMPO
5092 06274-2544	B 114 6.0291	59.71 0.428	2037.10 21.2	0.538 358.5	179.5 2015.9132	16.5 0.613 18.9 0.601	DOCOBO et al. (*)
- 06541+6052	HEI 334 47.4121	7.593 0.323	2005.837 120.5	0.729 68.4	134.5 2007.8181	279.2 0.369 265.8 0.344	DOCOBO & CAMPO (I)
- 06541+6052	HEI 334 32.3653	11.123 0.426	2008.569 111.6	0.421 69.1	113.3 2007.8181	182.7 0.216 148.7 0.275	DOCOBO & CAMPO (II)
7551 09524+2659	STF 1389 0.2476	1454. 2.773	2420.07 122.7	0.307 265.1	80.9 2013.314	290.1 2.506 289.9 2.508	LING
- 18434-5546	B 398 7.6531	47.04 0.279	2013.95 105.2	0.124 133.2	166.8 2015.7375	354.3 0.222 351.4 0.238	DOCOBO et al. (*)

NEW ORBITS (continuation)

ADS α2000δ	Name n	P a	T i	e ω	Ω(2000) Last ob.	2016 2017		Author(s)
-	KUI 103AB	28.90	2007.26	0.656	143.5	59.3	0.839	DOCOBO
21000+4004	12.4568	0.709	36.3	116.0	2012.90	64.5	0.879	& LING
16111	BU 1092AB	48.93	1994.48	0.742	45.5	211.4	0.277	DOCOBO
22361+7253	7.3571	0.215	66.4	349.3	2008.6560	212.7	0.292	& CAMPO
-	COU 542Aa,Ab	30.95	1987.56	0.391	19.8	131.9	0.124	DOCOBO
22570+2441	11.6317	0.182	21.7	174.9	2008.689	155.3	0.115	& LING

(*) DOCOBO, GOMEZ & CAMPO

NEW DOUBLE STARS

Discovered by: A. Debackère with the LCOGT network telescopes:
T2m Faulkes Telescope North, Hawaii and T1m Mac Donald, Texas

STAR	UCAC4 USNO-B1.0	Mag.		Coord. 2000	Epoch	θ (°)	ρ (″)	nigths
DBR 1 BC	707-109961	10.9	16.4	23:03:08.93+51:20:23.5	2015.786	8.9	3.06	4
DBR 4	573-029417	12.6	13.4	06:27:08.52+24:28:39.0	2015.13	74.1	4.03	1
POU 1332*	573-029420	12.1	12.6	06:27:09.49+24:28:26.5	2015.14	323.6	15.54	2
DBR 5	558-048557	12.0	12.5	09:31:55.09+21:24:57.2	2015.21	283.9	2.71	2
DBR 13 BC	707-109870	14.3	17.5	23:02:39.65+51:21:17.3	2015.875	276.2	1.64	1
DBR 15	584-028228	13.8	15.2	06:21:43.04+26:44:54.0	2015.93	309.0	2.21	3
DBR 16	584-028468	13.0	15.4	06:22:38.73+26:46:42.1	2015.93	303.1	3.03	3
DBR 17	583-028424	13.1	13.7	06:23:02.29+26:29:20.1	2015.93	128.3	2.99	3
DBR 18	584-028158	13.9	16.4	06:21:24.08+26:46:20.2	2015.93	28.6	4.55	3
DBR 19	585-028193	12.5	15.3	06:21:45.48+26:48:37.9	2015.93	314.4	4.17	3
DBR 20	584-028267	14.3	17.9	06:21:53.83+26:42:34.0	2015.93	129.8	3.68	3
DBR 21	584-028292	14.1	17.9	06:21:59.04+26:45:38.1	2015.93	22.6	2.85	3

* The second component of POU 1332 has a companion called C in DBR 4 BC

NEW DOUBLE STARS

Discovered by: A. Debackère with the LCOGT network telescopes:
T2m Faulkes Telescope North, Hawaii and T1m Mac Donald, Texas
(continuation)

STAR	UCAC4 USNO-B1.0	Mag.	Coord. 2000	Epoch	θ (°)	ρ (″)	nigths
DBR 22	584-028320	14.4 16.4	06:22:04.60+26:44:58.2	2015.93	109.4	4.27	2
DBR 23	584-028528	14.2 17.6	06:22:54.39+26:46:53.6	2015.92	176.7	3.58	1
DBR 24	583-028399	15.2 19.3	06:22:56.46+26:29:29.3	2015.93	226.2	3.29	2
DBR 25	1165-0112266	17.2 18.3	06:23:01.44+26:31:43.5	2015.93	113.1	2.97	2
DBR 26	583-028466	14.0 15.4	06:23:11.33+26:35:40.1	2015.93	167.2	1.46	2
DBR 27	584-028614	16.2 16.7	06:23:14.51+26:45:57.0	2015.92	167.6	3.43	1
DBR 28	584-028640	13.6 17.8	06:23:19.98+26:37:18.1	2015.93	202.8	3.98	2
DBR 29	583-028515	16.2 16.8	06:23:21.81+26:35:34.4	2015.93	270.1	1.15	2
DBR 30	583-028563	13.4 17.8	06:23:31.83+26:35:33.1	2015.93	130.7	2.67	2
DBR 31	583-028527	13.8 17.0	06:23:24.17+26:31:44.5	2015.93	357.7	2.16	2
DBR 32	583-028537	16.5 18.4	06:23:25.95+26:31:21.9	2015.93	158.8	1.74	2
DBR 33	707-109950	14.6 15.8	23:03:04.53+51:16:32.6	2015.793	60.1	2.71	6
DBR 34	707-109914	15.6 16.5	23:02:52.44+51:21:30.7	2015.790	325.8	1.77	5
DBR 35	708-113278	13.5 16.1	23:02:21.70+512:45:6.7	2015.784	98.2	2.02	3
DBR 36	707-109971	14.8 16.3	23:03:13.13+51:19:12.5	2015.795	255.0	2.16	3
DBR 37	708-113378	17.0 18.7	23:02:48.80+512:54:9.0	2015.783	81.1	1.16	2
DBR 38	707-109869	16.3 17.6	23:02:39.58+51:18:32.6	2015.786	224.0	1.45	4
DBR 39 AB	707-110034	15.9 16.9	23:03:31.73+51:18:46.6	2015.790	97.9	12.03	1
DBR 39 AC	707-110034	15.9 17.6	23:03:31.73+51:18:46.6	2015.790	111.4	5.34	1
DBR 39 AD	707-110034	15.9 17.7	23:03:31.73+51:18:46.6	2015.790	121.5	4.93	1
DBR 39 CD*	None	17.6 17.7	23:03:32.27+51:18:44.6	2015.790	230.4	1.38	1
DBR 40	707-110063	15.5 16.0	23:03:43.16+51:18:42.2	2015.784	213.7	4.71	2
DBR 41	707-109895	15.7 17.5	23:02:45.86+51:23:06.9	2015.784	39.7	1.76	2
DBR 42	1414-0479010	16.4 17.2	23:03:15.56+51:25:13.7	2015.790	271.9	2.40	4
DBR 43	707-110249	15.0 17.6	23:04:51.66+51:18:52.7	2015.801	91.2	2.21	2
DBR 44	1413-0487341	16.8 17.0	23:03:56.22+51:22:49.0	2015.791	346.9	4.14	3
DBR 45	707-110064	15.5 16.2	23:03:43.43+51:18:46.0	2015.809	213.8	4.72	1
DBR 46	708-113710	13.6 16.2	23:04:28.82+51:25:53.3	2015.809	302.9	2.83	1
DBR 47	707-109988	13.0 15.9	23:03:18.66+51:19:15.1	2015.875	113.0	2.23	1
DBR 48	1414-0479625	17.1 17.5	23:04:04.17+51:27:23.9	2015.809	219.9	1.33	1
DBR 49	707-110076	15.8 16.1	23:03:47.48+51:20:31.0	2015.809	218.9	4.95	1
DBR 50	707-110015	16.3 18.1	23:03:25.05+51:20:23.5	2015.809	346.1	1.43	1

* The component C is located at about 2″ west of USNO-B1.0 1413-0487076

NEW DOUBLE STARS

Discovered by: A. Debackère with the LCOGT network telescopes:
T2m Faulkes Telescope North, Hawaii and T1m Mac Donald, Texas
(continuation)

STAR	UCAC4 USNO-B1.0	Mag.		Coord. 2000	Epoch	θ (°)	ρ (″)	nigths
DBR 51	707-110031	16.1	17.9	23:03:31.14+51:23:35.3	2015.798	256.2	1.54	2
DBR 52	707-110141	15.6	17.8	23:04:11.47+51:21:23.7	2015.809	96.0	3.43	1
DBR 53	708-113707	15.8	18.6	23:04:27.40+51:26:25.9	2015.809	208.6	2.22	1
DBR 54	1413-0487341	16.4	16.5	23:03:56.23+51:22:47.3	2015.803	6346.7	4.17	3
DBR 55	707-109911	15.5	15.9	23:02:51.16+51:18:14.9	2015.791	619.9	0.80	4
DBR 56	1134-0054304	17.6	17.7	04:04:46.14+23:28:28.1	2015.877	13.9	3.84	1
DBR 57	571-011176	16.6	16.9	04:24:12.83+24:11:45.7	2015.877	255.5	4.80	1
DBR 58 PaPb*	762-029118	11.9	12.5	04:08:09.04+62:20:07.1	2015.877	226.5	0.94	1
DBR 59	708-113245	15.5	18.5	23:02:09.78+51:25:10.6	2015.829	205.6	2.36	2
DBR 60	707-109787	13.8	17.1	23:02:09.62+51:23:00.6	2015.829	325.8	2.43	2
DBR 61	1413-0486352	17.7	18.8	23:02:30.34+51:22:15.9	2015.829	45.9	1.78	2
DBR 62	707-109896	13.2	17.0	23:02:45.88+51:19:24.1	2015.829	132.9	4.64	5
DBR 63	1413-0486312	17.8	18.1	23:02:27.26+51:19:26.0	2015.829	103.0	1.38	2
DBR 64	1414-0478617	18.2	18.8	23:02:43.57+51:25:03.7	2015.829	9.6	1.74	2
DBR 65	708-113707	15.8	18.1	23:04:27.38+51:26:25.8	2015.801	209.8	2.19	2
DBR 66	708-113710	13.5	16.1	23:04:28.79+51:25:53.1	2015.801	302.8	2.67	2
DBR 67	708-113735	14.3	18.1	23:04:35.35+51:27:11.3	2015.801	220.4	3.51	2
DBR 68	708-113757	16.2	16.7	23:04:43.90+51:26:57.7	2015.801	185.9	1.45	2
DBR 69	708-113845	14.9	18.0	23:05:11.29+51:27:02.8	2015.801	176.8	3.05	2
DBR 70	708-113818	15.6	18.5	23:05:00.87+51:25:22.3	2015.801	34.9	4.11	2
DBR 71	708-113833	14.1	17.1	23:05:07.77+51:24:51.7	2015.801	28.5	4.08	2
DBR 72	707-110270	15.8	18.2	23:05:01.26+51:23:13.5	2015.801	312.4	2.76	2
DBR 73	707-110205	15.9	16.5	23:04:38.52+51:23:52.3	2015.795	111.3	4.13	3
DBR 74	707-110210	17.6	18.4	23:04:38.54+51:23:26.4	2015.795	92.8	4.17	3
DBR 75	708-113673	16.6	16.6	23:04:14.03+51:24:26.6	2015.801	50.2	3.63	2
DBR 76	707-110141	15.2	17.5	23:04:11.46+51:21:23.6	2015.795	96.3	3.31	3
DBR 77	707-110231	15.2	17.1	23:04:46.79+51:22:38.4	2015.795	71.5	4.75	3
DBR 78 AB	707-110237	16.3	16.6	23:04:48.37+51:21:53.4	2015.795	226.6	6.42	3
DBR 78 AC	707-110237	16.3	17.2	23:04:48.37+51:21:53.4	2015.795	288.5	3.72	3
DBR 79	707-110256	16.1	18.4	23:04:52.90+51:21:07.1	2015.795	307.3	3.41	3
DBR 80	1413-0487845	17.9	18.3	23:04:43.15+51:19:03.7	2015.801	101.9	2.39	2
DBR 81	707-110173	15.9	18.2	23:04:24.28+51:19:16.0	2015.795	43.1	4.03	3
DBR 82	1413-0487641	17.6	19.1	23:04:26.54+51:19:29.3	2015.801	7.4	2.55	2

* The component P of HZG 2 OP has a compagnion, separation about 1″

NEW DOUBLE STARS

Discovered by: A. Debackère with the LCOGT network telescopes:
T2m Faulkes Telescope North, Hawaii and T1m Mac Donald, Texas
(continuation)

STAR	UCAC4 USNO-B1.0	Mag.		Coord. 2000	Epoch	θ (°)	ρ (″)	nigths
DBR 83	707-110227	15.9	18.0	23:04:45.98+51:18:17.7	2015.795	345.2	4.44	3
DBR 84	707-109996	16.3	17.6	23:03:20.84+51:21:23.0	2015.875	275.9	1.56	1
DBR 85	707-109973	13.5	16.4	23:03:13.97+51:15:35.3	2015.875	227.3	2.15	1
DBR 86	1413-0503194	19.0	19.5	23:03:09.52+51:20:17.2	2015.787	327.2	62.49	1
DBR 87	613-003361	18.6	20.8	01:07:17.30+32:27:04.0	2015.952	108.3	1.58	1
DBR 88 AB	1224-0019281	16.7	18.2	01:07:08.27+32:24:40.0	2015.952	317.6	13.74	1
DBR 88 AC	1224-0019281	16.7	19.3	01:07:08.27+32:24:40.0	2015.952	74.4	6.28	1
DBR 88 AD	1224-0019281	16.7	21.0	01:07:08.27+32:24:40.0	2015.952	199.2	2.91	1

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5. ANDRADE, M. & DOCOBO, J. A.: *The dynamical evolution of the multiple stellar system α Gem*. Astron. Soc. of the Pacific Conf. Ser. **496**, 94 (2015).

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ANNOUNCEMENTS

BDB: THE BINARY STAR DATABASE

The Binary star DataBase (BDB) is the world's principal database of binary and multiple systems of all observational types. The ongoing mission of BDB is to provide a comprehensive and easy-to-use database of fundamental information for known (cataloged) objects in multiple stellar systems. BDB contains data on physical and positional parameters of 240,000 components of 130,000 systems of multiplicity 2 and more, belonging to various observational types: visual, interferometric, spectroscopic, eclipsing, X-ray, etc. The current database is the result of a systematic integration of data from tens of heterogeneous sources of data — astronomical catalogues and surveys. BDB can be queried by star identifier, coordinates, and other parameters. Further information about BDB content and functionality is available at the BDB website (http://bdb.inasan.ru) and in various publications (e.g., Kaygorodov et al. 2012, Baltic Astronomy 21, 309; Kovaleva et al. 2015, Astronomy and Computing 11, 119).

A new version of BDB, with improved interface, drastically improved performance and enhanced visualization results, will be available in Oct 2015.

Due to necessity of a unified and consistent system for designation of objects in the database, Binary Star DataBase (BSDB) designation scheme for identifying objects in double and multiple systems was developed (Kovaleva et al. 2015, Baltic Astronomy 24, 185). The BSDB scheme covers all types of observational data. Three classes of objects (system, pair, component) introduced within the BSDB nomenclature provide correct links between objects and data, which is especially important for complex multiple stellar systems.

The principles underlying BSDB identifier compilation satisfy the "IAU Specifications concerning designations for astronomical radiation sources outside the solar system". On Jul 2015 BSDB acronym was accepted by the IAU Registry and entered into the Reference Dictionary of Nomenclature of Celestial Objects.

Oleg Malkov, Dana Kovaleva and Pavel Kaygorodov

JEAN-PAUL ZAHN (1935 - 2015)

We were saddened to learn of the death of Jean-Paul Zahn, Emeritus astronomer at the Paris Observatory. Our esteemed friend and colleague passed away on July 15 2015.

Jean-Paul Zahn began his career in 1962 at the Institut d'Astrophysique de Paris in the group of Evry Schatzman. In 1966, he defended his dissertation there under the title "The tidal in a close double star". In this work, he described the properties of tides in a close double star for the first time. In addition, he provided the first description of the physical mechanisms that act on the dynamic evolution of the system and the evolution of stellar components. In that same year, he was appointed to the position of Astronomer at the Nice Observatory of which he was the Director from 1972 to 1981.

While Paul Couteau and Paul Muller, distinguished members of Commission 26 "Double Stars", observed the visual double star with the 74 cm and 50 cm refractors, welcomed Antoine Labeyrie whose first two interferometer telescopes opened the way for modern developments in the high angular resolution study of double stars. As a physicist in the field of fluid dynamics, the studies of Jean-Paul Zahn have made major contributions to the theory of the internal structure of stars and stellar evolution.

Regarding binary stars, he studied in detail the physical phenomena induced by the tidal such as non-adiabatic stellar oscillations generated by the periodic variation of the gravitational field (J. P. Zahn , 1970, 1975), the friction phenomena in the convective envelope and the evolution of a binary system under the effect of including the tidal circularization of the orbit, and the synchronization of stellar rotation and associated physical phenomena .

Jean-Paul Zahn was primarily a theoretician but he attached great importance to the "theory-observation" interface. He considered with great interest the spectroscopic and high angular resolution observations that allow the precise determination of fundamental stellar parameters necessary to test the internal structure of models of stellar evolution.

Jean-Paul Zahn was the Director of the Observatory of the Pic du Midi and Toulouse from 1981 to 1988 before joining the Paris Observatory in 1993.

Among his numerous national and international responsibilities, it should be noted that Jean-Paul Zahn was President of the IAU Commission 35, "Constitution of Stars", from 1997-2000.

His enthusiasm and warm character will remain in our memories.

Daniel Bonneau
Honorary astronomer at Côte d'Azur Observatory

MERCEDES THARAM RICHARDS (1955 - 2016)

It saddens me deeply to convey the message of the passing of one of the most prominent interacting binary scientists of our community.

Mercedes has been an inspiration and an idol to all, and a personal friend to many. Mercedes was the last President of IAU Commission 42 and I had the privilege of working closely with her during the past several years. She was a strong, balanced, and complete person with remarkable insights and unique talents. Mercedes will be profoundly missed.

Please join me in extending our heartfelt sympathies to her husband, Don, and daughters, Chandra and Suzanne.

With deep regrets,

Andrej Prsa
IAU Commission G1 president

More information at the website of Prenn State Eberly College of Science:
`http://science.psu.edu/news-and-events/in-memoriam-mercedes-richards-1955-2016`

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The deadline for contributions to Information Circular No. 189 is:

June 15th 2016

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