

# Searching for substellar companion candidates with *Gaia*

## II. A catalog of 9,698 planet candidate solar-type hosts

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### ABSTRACT

**Context.** In a previous paper, we have introduced a new tool called "*Gaia* DR3 proper motion anomaly and astrometric noise excess", or *Gaia*PMEX for short. It characterizes the mass and semi major axis relative to the central star (sma hereafter) of a possible companion around any source observed with *Gaia* using the value of renormalised unit weight error (ruwe), or with both *Gaia* and *HIPPARCOS* using the value of proper motion anomaly (PMa), alone or combined with the ruwe.

**Aims.** Our goal is to exploit the large volume of sources in the *Gaia* DR3 catalog and find new exoplanet candidates. We wish to create a new input catalog of planet-candidate hosting systems to the disposal of future follow-up projects. Beyond magnitude 14, this catalog would prepare the arrival of powerful instruments on the Extremely Large Telescopes, that could include radial velocity follow-up of faint stars and direct imaging of planets around main sequence Gyr-old stars.

**Methods.** We used the mass–sma degenerate set of solutions obtained by *Gaia*PMEX from any value of ruwe to select a sample of bright ( $G < 16$ ) *Gaia* sources whose companions could be in the planetary domain, with a mass  $< 13.5 M_J$ . We selected sources whose astrometric signature determined from the ruwe is larger than zero with a significance  $> 2.7\text{-}\sigma$  ( $p\text{-value} < 0.00694$ ).

**Results.** It led us to identify a sample of 9,698 planet candidate hosting sources, with a companion having a mass possibly  $< 13.5 M_J$  in the range of sma  $\sim 1\text{--}3$  au. We cross-matched our catalog with the NASA Exoplanet Archive (NEA) catalog of exoplanets. We identified 19 of our systems that were also found in the NEA. We successfully detected 8 confirmed substellar companions with an sma of  $1\text{--}3$  au, initially discovered and characterised with radial velocity and astrometry. Moreover, we found 6 transiting-planet systems and 2 wide-orbit systems for whom, with *Gaia*PMEX, we predict the existence of supplementary companions. Focusing on the subsample of sources observed with *HIPPARCOS*, combining the constraints from ruwe and PMa, we confirmed the identification of 4 new planetary candidate systems HD 187129, HD 81697, CD-42 883, and HD 105330.

**Conclusions.** Given the degeneracy of mass–sma, many of the candidates in this 9,698 sources catalog might have a larger mass, in the brown-dwarf and stellar domain, if their sma departs from the  $1\text{--}3$ -au range. The vetting of this large catalog will be the subject of future studies.

**Key words.** exoplanets detection ; astrometry ; radial velocities

### Note from Authors

Appendices D to F are printed in the following pages.

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## Appendix D: Astrometric signatures determined for the sources in H23

Table D.1: Details and predicted  $\alpha_{\text{astro,H23}}$  on the 202 sources from the Holl et al. (2023) sample with  $G < 16$  and comparison to the  $\alpha_{\text{astro,DR3}}$ . See Sections 4.1 and Appendix C for explanations.

<i>Gaia</i> DR3 ID	Alias	Period <sup>(a)</sup> d	$\sigma_P$ d	$\alpha_\star$ <sup>(b)</sup> mas	$\sigma_{a,\star}$ mas	$a_{\text{pl}}$ AU	$\sigma_{a_{\text{pl}}}$ AU	$q$	$\sigma_q$	$M_{\star,\text{Flame}}$	$\text{SB}^{(c)}$ mas	$\sigma_{\alpha,\text{H23}}$ mas	$\alpha_{\text{UEVA,H23}}$ mas	$\sigma_{\alpha,\text{H23}}$ mas	$S_{\alpha,\text{rue}}$ $N - \sigma$	dataset	$\widetilde{M}_c^{(d)}$ index
1594127865540229888	HD 132406	974.0	39.0	0.157	0.041	1.905	0.108	0.006	0.002	0.97	0	0.072	0.019	0.087	1.8	5p	0
2603090003484152064	BD-15 6290	61.0	0.0	0.426	0.054	...	...	...	...	...	0	0.194	0.024	0.195	2.8	5p	0
2884087104955208064	HD 40503	826.5	49.9	0.255	0.024	1.592	0.102	0.006	0.001	0.79	0	0.116	0.011	0.122	4.0	5p	0
2367734656180397952	BD-17 63	655.6	0.6	0.217	0.023	...	...	...	...	...	0	0.099	0.010	0.086	2.7	5p	0
4062446910648807168	HD 164604	641.5	10.1	0.565	0.220	1.320	0.067	0.017	0.007	0.75	0	0.257	0.100	0.174	6.2	5p	0
1712614124767394816	BD+75 510	297.6	2.7	0.213	0.033	...	...	...	...	...	0	0.097	0.015	0.041	1.1	5p	0
4745373133284418816	* iot Hor	312.0	5.0	0.300	0.026	0.923	0.047	0.006	0.001	1.08	0	0.137	0.012	0.000	0.1	5p	0
4976894960284258048	HD 142	350.3	3.6	0.211	0.029	1.039	0.052	0.005	0.001	1.22	0	0.096	0.013	0.000	0.0	5p	0
5855730584310531200	HD 111232	1143.0	14.0	0.511	0.032	2.063	0.105	0.007	0.001	0.90	0	0.207	0.034	0.140	3.6	5p	0
637329067477530368	HD 81040	1001.7	7.0	0.387	0.032	1.934	0.097	0.007	0.001	0.96	0	0.176	0.015	0.221	6.7	5p	0
6421118739093252224	HD 175167	1290.0	22.0	0.220	0.022	2.386	0.122	0.007	0.001	1.09	0	0.070	0.013	0.108	3.0	5p	0
3921176983720146560	HD 106888	365.6	0.1	1.318	0.141	1.032	0.052	0.083	0.010	1.10	0	0.600	0.064	0.520	>9	5p	1
3309006602007842048	HD 30246	990.7	5.6	1.343	0.235	1.911	0.096	0.034	0.006	0.95	0	0.612	0.107	0.534	>9	5p	1
5563001178343925376	HD 52756	52.9	0.0	0.536	0.079	0.256	0.013	0.068	0.011	0.80	0	0.244	0.036	0.162	4.6	5p	1
855523714036230016	HD 92320	145.4	0.0	0.775	0.026	0.533	0.027	0.066	0.004	0.96	1	0.353	0.012	0.414	>9	5p	1
824461960796102528	HD 82460	590.9	0.2	1.633	0.092	1.362	0.068	0.061	0.005	0.96	0	0.744	0.042	0.461	>9	5p	1
2778298280881817984	HD 5433	576.6	1.6	1.037	0.031	1.346	0.067	0.049	0.003	0.98	0	0.472	0.014	0.573	>9	5p	1
685029558383335168	HD 77065	119.1	0.0	1.039	0.068	0.441	0.022	0.078	0.006	0.81	0	0.473	0.031	0.425	>9	5p	1
1142214430312151424	HD 48679	1111.6	0.3	3.150	0.145	1.908	0.071	0.103	0.007	0.93	0	1.372	0.185	0.824	>9	5p	1
4753355209745022208	HD 17155	1426.1	0.7	7.925	0.357	...	...	...	...	...	0	...	...	0.893	>9	5p	1
2651390587219807744	BD-00 4475	723.2	0.7	1.912	0.280	1.467	0.073	0.056	0.009	0.81	0	0.871	0.128	0.750	>9	5p	1
131810830190386048	HD 148284	339.3	0.0	0.696	0.334	0.994	0.050	0.085	0.029	1.14	1	0.317	0.152	0.318	>9	5p	1
873616860770228352	BD+29 1539	175.9	0.0	0.606	0.143	0.582	0.029	0.065	0.016	0.85	0	0.276	0.065	0.253	>9	5p	1
6374231714992810752	HD 190583	663.0	0.3	0.546	0.011	1.702	0.085	0.070	0.004	1.50	0	0.249	0.005	0.278	>9	5p	1
4748772376561143424	CD-50 869	1613.2	177.8	4.107	0.078	2.492	0.221	0.090	0.011	0.79	1	0.715	0.161	1.051	>9	5p	1
3750881083756656128	HD 91669	497.5	0.6	0.729	0.038	...	...	...	...	...	0	0.332	0.017	0.285	>9	5p	1
6490284754986167552	CD-61 6801	24.8	0.0	0.175	0.024	...	...	...	...	...	0	0.080	0.011	0.089	2.7	5p	1
599024986946599808	CD-46 10046	242.5	0.3	0.470	0.018	...	...	...	...	...	0	0.214	0.008	0.189	7.3	5p	1
6913810483612308480	Ross 193	23.9	0.0	0.922	0.020	...	...	...	...	...	0	0.420	0.009	0.495	>9	5p	1
6264881882000588672	HD 137812	73.0	0.0	1.144	0.022	...	...	...	...	...	1	0.521	0.010	0.299	7.3	5p	1
3280086388180617600	HD 27642	706.1	16.6	2.619	0.090	1.647	0.086	0.084	0.005	1.20	0	1.193	0.041	1.171	>9	5p	1
5526720593166247680	HD 72834	145.3	0.1	2.534	0.102	0.476	0.020	0.211	0.024	1.07	1	1.154	0.046	0.563	>9	5p	1
4321775627212956672	HD 184962	33.7	0.0	0.258	0.050	0.222	0.011	0.067	0.013	1.29	0	0.118	0.023	0.083	1.5	5p	1
3751763647996317056	HD 89707	297.7	0.0	1.824	0.293	...	...	...	...	...	0	0.831	0.133	0.809	>9	5p	1
103500055055287680	HD 68638	240.9	0.4	0.712	0.027	...	...	...	...	...	0	0.324	0.012	0.357	>9	5p	1
1236764218322666880	HD 130396	2060.6	7.3	5.776	0.912	3.312	0.166	0.079	0.013	1.14	0	0.628	0.136	1.754	>9	5p	1
2161507648230817792	HD 166356	261.5	0.1	1.064	0.021	0.829	0.041	0.079	0.004	1.11	1	0.485	0.010	0.472	>9	5p	1
5583755078792642304	HD 47391	214.1	0.1	1.058	0.018	...	...	...	...	...	0	0.482	0.008	0.503	>9	5p	1

Table D.1: Continuing...

<i>Gaia</i> DR3 ID	Alias	Period <sup>(a)</sup> d	$\sigma_P$ d	$\alpha_\star^{(b)}$ mas	$\sigma_{a,\star}$ mas	$q_{pl}$ AU	$\sigma_{apl}$ AU	$q$	$\sigma_q$	$M_{\star,Flame}$	SB <sup>(c)</sup> mas	$\alpha_{UEVA,H23}$ mas	$\sigma_{\alpha,H23}$ mas	$\alpha_{UEVA,ruwe}$ mas	$s_{\sigma,ruwe}$ $N - \sigma$	dataset	$\widetilde{M}_c^{(d)}$ (5p/6p) index
438550286022654464	HD 151465	54.4	0.0	0.538	0.026	0.276	0.010	0.104	0.006	1.18	1	0.245	0.012	0.229	6.7	5p	1
1224551770875466496	HD 140913	147.9	0.0	0.850	0.074	0.548	0.027	0.076	0.007	1.00	1	0.387	0.034	0.301	>9	5p	1
1181993180456516864	HD 132032	274.3	0.2	1.083	0.073	0.832	0.042	0.073	0.006	1.02	0	0.493	0.033	0.419	>9	5p	1
2185171578009765632	HD 193468	291.8	0.9	1.418	0.139	0.955	0.048	0.080	0.009	1.37	0	0.646	0.063	0.285	3.7	6p	1
6158160019228728448	HD 109524	12.0	0.0	0.421	0.029	...	...	...	...	...	0	0.192	0.013	0.222	6.1	6p	1
2889380085212270080	HD 40705	1165.6	30.4	8.274	0.055	1.831	0.083	0.226	0.017	0.97	1	3.286	0.472	3.455	>9	5p	2
276487905502478720	HD 26596	900.4	7.6	8.287	0.094	1.542	0.065	0.278	0.015	1.08	0	3.774	0.043	3.017	>9	5p	2
3064145014608187392	HD 69076	115.1	0.1	3.173	0.037	0.379	0.014	0.234	0.012	0.90	0	1.445	0.017	1.251	>9	5p	2
4253017049075877120	HD 171999	21.0	0.0	0.619	0.039	...	...	...	...	...	0	0.282	0.018	0.305	7.9	5p	2
1348238101626698368	HD 157821	1253.5	18.4	8.657	0.037	1.960	0.083	0.322	0.018	1.26	1	2.961	0.386	3.413	>9	5p	2
4544260465016425344	HD 154064	235.7	0.7	1.085	0.054	0.729	0.027	0.149	0.011	1.27	0	0.494	0.024	0.415	>9	5p	2
3703975672901804160	HD 110802	56.5	0.0	1.031	0.047	0.257	0.010	0.184	0.012	1.04	0	0.469	0.022	0.211	7.6	5p	2
1527631807474248448	HD 112914	709.9	0.6	14.368	0.023	1.202	0.046	0.238	0.012	0.76	1	6.544	0.010	6.066	>9	5p	2
2208365672715184256	HD 216772	691.5	2.7	4.195	0.026	1.383	0.053	0.227	0.012	1.18	1	1.910	0.012	1.681	>9	5p	2
5045853099761604096	HD 18809	114.9	0.1	1.925	0.012	0.389	0.015	0.210	0.011	0.92	1	0.877	0.005	0.839	>9	5p	2
6525140510537736448	HD 221818	11.6	0.0	0.488	0.024	0.082	0.003	0.197	0.014	0.82	0	0.222	0.011	0.203	>9	5p	2
5236430419447179776	HD 102579A	169.6	0.1	4.815	0.030	0.450	0.018	0.312	0.018	0.82	1	2.193	0.014	2.167	>9	5p	2
4963661822446609792	HD 14629	512.6	0.5	5.924	0.031	...	...	...	...	...	1	2.698	0.014	1.735	>9	5p	2
1305309456826990464	HD 147487	533.6	0.5	5.643	0.024	...	...	...	...	...	1	2.570	0.011	2.954	>9	5p	2
6511657371244871680	HD 212038	1000.4	7.0	9.033	0.026	...	...	...	...	...	1	4.114	0.012	3.607	>9	5p	2
1529439851267809024	HD 113578	196.6	0.1	3.549	0.046	...	...	...	...	...	1	1.616	0.021	1.440	>9	5p	2
787672026858725632	HD 233870	330.6	0.4	3.893	0.161	...	...	...	...	...	1	1.773	0.073	1.494	>9	5p	2
5902262122552686848	HD 134237	774.3	3.4	9.013	0.028	...	...	...	...	...	0	4.105	0.013	2.949	>9	5p	2
6542137929509574144	HD 218483	573.1	1.1	3.632	0.070	1.160	0.042	0.116	0.010	0.81	1	1.654	0.032	2.035	>9	5p	2
5631222984331124864	HD 81044	15.4	0.0	0.720	0.230	0.095	0.005	0.250	0.059	0.81	1	0.328	0.105	0.352	>9	5p	2
5490419250399767680	HD 56351	228.7	0.2	3.355	0.022	0.586	0.024	0.265	0.014	0.90	1	1.528	0.010	1.898	>9	5p	2
6631710606341412096	HD 173397	937.0	6.4	13.628	0.031	1.408	0.062	0.311	0.017	0.82	1	6.207	0.014	3.704	>9	5p	2
6334716469679728000	HD 134251	54.0	0.0	1.193	0.264	0.232	0.013	0.244	0.055	0.95	0	0.544	0.120	0.166	4.4	5p	2
603701328976020864	V* HL Cnc	44.1	0.0	0.967	0.041	0.204	0.008	0.243	0.016	0.97	0	0.441	0.019	0.347	>9	5p	2
5957920668132624256	HD 162020	8.4	0.0	0.919	0.029	...	...	...	...	...	0	0.419	0.013	0.392	>9	5p	2
6661911579416783616	HD 178445	62.8	0.0	3.973	0.016	...	...	...	...	...	1	1.810	0.007	0.769	>9	5p	2
3028470161558479232	HD 58760	121.4	0.0	6.131	0.053	0.333	0.015	0.368	0.027	0.73	1	2.793	0.024	3.257	>9	5p	2
5086152743542494592	V* AK For	4.0	0.0	0.200	0.013	...	...	...	...	...	0	0.091	0.006	0.065	2.2	5p	2
286293109680203008	BD+61 784	393.7	0.5	2.070	0.182	0.984	0.049	0.092	0.017	0.82	1	0.943	0.083	1.491	>9	5p	2
5841850590016284544	CPD-72 1292B	1170.8	14.1	10.588	0.057	1.610	0.080	0.385	0.028	0.92	1	4.156	0.605	3.312	>9	5p	2
2299519550340109696	BD+82 688	141.7	0.0	2.507	0.016	0.431	0.018	0.277	0.015	0.95	1	1.142	0.007	0.881	>9	5p	2
861776842822330368	HD 95209	33.6	0.0	1.098	0.121	0.145	0.009	0.431	0.056	0.91	1	0.500	0.055	0.286	>9	5p	2
6778413151435607680	V* BO Mic	1010.2	10.4	10.934	0.052	...	...	...	...	...	0	4.980	0.024	3.649	>9	5p	2
528979360842855808	HD 66030	690.8	1.5	4.684	0.050	1.277	0.060	0.390	0.026	1.33	1	2.133	0.023	1.597	>9	5p	2
6257172793656011520	HD 133412	552.2	1.9	11.128	0.061	...	...	...	...	...	1	5.069	0.028	3.864	>9	5p	2
422886126401496064	Ross 310	295.5	0.1	10.211	0.021	...	...	...	...	...	1	4.651	0.010	4.349	>9	5p	2
5657709399107097600	HD 83939	243.9	0.9	0.548	0.016	...	...	...	...	...	0	0.249	0.007	0.308	>9	5p	2

Table D.1: Continuing...

<i>Gaia</i> DR3 ID	Alias	Period <sup>(a)</sup> d	$\sigma_P$ d	$\alpha_\star$ <sup>(b)</sup> mas	$\sigma_{a,\star}$ mas	$q_{pl}$ AU	$\sigma_{apl}$ AU	$q$	$\sigma_q$	$M_{\star,Flame}$	SB <sup>(c)</sup> mas	$\alpha_{UEVA,H23}$ mas	$\sigma_{\alpha,H23}$ mas	$\alpha_{UEVA,ruwe}$ mas	$s_{\alpha,ruwe}$ $N - \sigma$	dataset	$\widetilde{M}_c^{(d)}$ index
5096613016130459136	HD 26995	51.6	0.0	0.483	0.022	...	...	...	...	...	0	0.220	0.010	0.226	>9	5p	2
6075391292173461760	CD-56 4281	786.9	3.9	1.252	0.034	...	...	...	...	...	1	0.570	0.015	0.506	>9	5p	2
5041087953805187584	HD 7452	665.8	2.1	6.083	0.046	...	...	...	...	...	1	2.770	0.021	1.389	>9	5p	2
5459518648630576768	HD 87080	274.6	0.2	1.593	0.018	...	...	...	...	...	1	0.725	0.008	0.440	>9	5p	2
4829273360906556672	CD-52 763	305.8	1.9	0.325	0.062	...	...	...	...	...	1	0.148	0.028	0.139	5.0	5p	2
5361232754474635776	CD-48 5958	815.6	4.9	0.550	0.034	...	...	...	...	...	0	0.251	0.016	0.192	>9	5p	2
1648950576156773760	BD+69 880	564.3	1.2	3.030	0.100	1.138	0.045	0.151	0.017	0.84	1	1.380	0.046	1.069	>9	5p	2
3116065985196889216	BD+03 1552	852.4	7.8	8.272	0.042	...	...	...	...	...	1	3.767	0.019	3.058	>9	5p	2
6608926350294211328	HD 214829	79.1	0.1	0.409	0.159	0.352	0.024	0.212	0.083	1.45	0	0.186	0.073	0.160	4.6	5p	2
6076629204819105664	CD-54 4573	143.6	0.1	0.725	0.041	...	...	...	...	...	1	0.330	0.018	0.242	>9	5p	2
6873251629971269632	BD-17 5963	126.0	0.2	0.642	0.022	...	...	...	...	...	0	0.292	0.010	0.314	>9	5p	2
4354357901908595456	HD 149414	133.5	0.1	3.814	0.014	...	...	...	...	...	1	1.737	0.007	0.963	>9	5p	2
283446302278774528	BD+61 812	22.8	0.0	0.660	0.019	...	...	...	...	...	0	0.301	0.009	0.250	>9	5p	2
6130370305216737408	HD 106770	19.5	0.0	0.193	0.019	0.125	0.004	0.137	0.015	0.91	0	0.088	0.009	0.078	2.3	5p	2
2431188610386566784	BD-08 15	879.3	22.8	0.721	0.024	...	...	...	...	...	0	0.328	0.011	0.269	>9	5p	2
2843794470563210496	BD+24 4697	145.3	0.1	2.060	0.146	0.434	0.019	0.189	0.029	0.76	1	0.938	0.066	0.713	>9	5p	2
3603119331007599232	BD-17 3874	145.4	0.1	5.021	0.014	...	...	...	...	...	1	2.287	0.006	0.979	>9	5p	2
4921427313081081600	CD-55 141	1073.8	50.3	0.899	0.119	...	...	...	...	...	0	0.410	0.054	0.351	>9	5p	2
4666680536328166528	CD-69 185	511.2	2.2	0.662	0.015	...	...	...	...	...	0	0.301	0.007	0.302	>9	5p	2
1813985523437968256	HD 352975	302.5	0.5	2.847	0.020	...	...	...	...	...	1	1.297	0.009	1.219	>9	5p	2
266076492460606592	G 191-B2A	567.1	1.7	4.299	0.339	1.079	0.069	0.199	0.068	0.80	1	1.958	0.154	2.041	>9	5p	2
4950186203640554880	CD-42 862	305.5	0.3	3.506	0.032	0.695	0.028	0.213	0.013	0.75	1	1.597	0.015	1.626	>9	5p	2
107511930591409280	BD+27 335A	208.1	0.5	2.125	0.045	...	...	...	...	...	1	0.968	0.020	0.562	>9	5p	2
5710296119685549440	HD 72928	41.0	0.0	1.666	0.012	...	...	...	...	...	1	0.759	0.005	0.628	>9	5p	2
6678530491511225856	CD-40 14067	911.3	2.9	9.257	0.038	...	...	...	...	...	0	4.216	0.017	3.821	>9	5p	2
6448639343335797888	HD 188622	29.7	0.0	0.177	0.015	0.175	0.007	0.184	0.018	1.19	0	0.081	0.007	0.087	2.5	5p	2
6399966162596931712	L 117-123	381.2	0.1	8.506	0.048	...	...	...	...	...	0	3.874	0.022	2.754	>9	5p	2
2370173652144123008	BD-18 113	10.3	0.0	0.274	0.037	0.071	0.004	0.380	0.055	0.98	0	0.125	0.017	0.145	4.9	5p	2
3176470817561155200	BD-15 728	17.4	0.0	0.475	0.016	...	...	...	...	...	0	0.216	0.007	0.218	>9	5p	2
6807019282894453504	CD-23 16484	150.8	0.1	1.931	0.064	...	...	...	...	...	1	0.879	0.029	0.974	>9	5p	2
1294000704856807168	BD+36 2517	125.3	0.1	1.699	0.056	...	...	...	...	...	1	0.774	0.026	0.645	>9	5p	2
6827751124390424320	CD-24 16586	306.3	0.3	3.856	0.047	...	...	...	...	...	1	1.756	0.021	1.779	>9	5p	2
4800235533695856256	HD 273259	430.6	1.7	1.304	0.084	0.971	0.042	0.251	0.024	1.11	1	0.594	0.038	0.503	>9	5p	2
2396173975404592512	CD-23 17675	478.2	2.1	2.361	0.088	0.907	0.044	0.364	0.036	0.95	1	1.075	0.040	0.817	>9	5p	2
3683727208499815936	TYC 4949-449-1	114.8	0.1	0.362	0.087	...	...	...	...	...	0	0.165	0.040	0.120	4.1	5p	2
5503370333440752384	TYC 8121-566-1	815.4	41.6	0.629	0.037	1.716	0.089	0.113	0.010	1.28	0	0.287	0.017	0.217	>9	5p	2
4902020348734646912	TYC 8841-182-1	189.7	0.5	0.090	0.011	...	...	...	...	...	0	0.041	0.005	0.023	0.8	5p	2
5013703860801457280	TOI-355	299.0	1.2	0.757	0.100	0.732	0.033	0.290	0.032	1.07	1	0.345	0.045	0.412	>9	5p	2
2133476355197071616	Kepler-16	41.1	0.0	0.643	0.032	0.175	0.007	0.235	0.014	0.69	1	0.293	0.015	0.276	>9	5p	2
491956219762515456	TYC 8467-1514-1	224.7	0.9	0.438	0.022	...	...	...	...	...	0	0.200	0.010	0.123	4.7	5p	2
4824625656537163008	WT 2401	81.1	0.1	0.830	0.023	...	...	...	...	...	0	0.378	0.010	0.327	>9	5p	2
4942195301023352320	HD 12055	960.0	1.4	4.800	0.056	...	...	...	...	...	0	2.186	0.025	2.689	>9	5p	2

Table D.1: Continuing...

<i>Gaia</i> DR3 ID	Alias	Period <sup>(a)</sup> d	$\sigma_P$ d	$\alpha_\star^{(b)}$ mas	$\sigma_{a,\star}$ mas	$q_{pl}$ AU	$\sigma_{apl}$ AU	$q$	$\sigma_q$	$M_{\star,Flame}$	$SB^{(c)}$	$\alpha_{UEVA,H23}$ mas	$\sigma_{\alpha,H23}$ mas	$\alpha_{UEVA,ruwe}$ mas	$S_{\sigma,ruwe}$ $N - \sigma$	dataset	$\widetilde{M}_c^{(d)}$ (5p/6p) index
5808612830236138368	* zet TrA	13.0	0.0	2.170	0.054	0.093	0.004	0.238	0.013	1.06	0	0.988	0.024	1.261	>9	5p	2
725469767850488064	* 35 Leo	523.8	6.2	4.902	0.048	1.217	0.048	0.110	0.006	1.11	0	2.233	0.022	1.297	>9	5p	2
4525943082344640256	HD 170829	26.4	0.0	0.902	0.015	...	...	...	...	...	0	0.411	0.007	0.323	>9	5p	2
477432822246003840	HD 29781	163.7	0.2	0.768	0.012	...	...	...	...	...	1	0.350	0.005	0.381	>9	5p	2
2888649013058936448	HD 39718	1105.5	22.0	3.301	0.043	...	...	...	...	...	1	...	...	1.499	>9	5p	2
596878550087942528	HD 75767	10.2	0.0	1.011	0.055	0.076	0.003	0.256	0.019	0.95	0	0.460	0.025	0.275	>9	5p	2
5865296850880144256	HD 117923	989.1	11.9	4.832	0.101	...	...	...	...	...	1	2.201	0.046	1.577	>9	5p	2
5961294592641279104	HD 160874	765.1	7.4	2.209	0.022	...	...	...	...	...	0	1.006	0.010	0.805	>9	5p	2
1695571110421334144	* 9 UMi	450.2	0.6	4.423	0.029	1.059	0.039	0.132	0.008	1.02	1	2.014	0.013	2.464	>9	5p	2
5564490982239584768	HD 54038	716.1	4.3	2.417	0.023	...	...	...	...	...	1	1.101	0.010	1.064	>9	5p	2
5391879235910368768	HD 93316	645.0	0.9	1.798	0.025	...	...	...	...	...	1	0.819	0.011	0.707	>9	5p	2
316256588242414592	HD 9616	166.7	0.2	3.569	0.173	0.518	0.028	0.281	0.050	1.21	1	1.625	0.079	1.467	>9	5p	2
3579784327012046336	HD 108510	90.1	0.0	1.979	0.010	0.360	0.013	0.144	0.007	1.04	1	0.901	0.005	0.237	6.0	5p	2
4972788662311608960	HD 2070	115.2	0.0	4.220	0.006	...	...	...	...	...	1	1.922	0.003	1.265	>9	5p	2
6708063202046601344	HD 167954	120.0	0.0	3.876	0.012	0.403	0.016	0.312	0.016	1.17	1	1.765	0.006	1.476	>9	5p	2
6647630950597964544	HD 164427	108.6	0.0	2.948	0.026	...	...	...	...	...	0	1.343	0.012	1.683	>9	5p	2
1568219729458240128	HD 110833	273.9	0.1	9.946	0.162	...	...	...	...	...	1	4.530	0.074	3.838	>9	5p	2
5523408692342861696	HD 72816	685.4	1.5	2.438	0.023	...	...	...	...	...	1	1.110	0.011	1.195	>9	5p	2
3550762648877966336	HD 94340	1122.7	0.4	13.230	0.232	...	...	...	...	...	0	...	...	3.577	>9	5p	2
3569106488558337792	HD 105913A	212.3	0.5	1.738	0.132	0.681	0.034	0.090	0.013	0.93	1	0.791	0.060	1.720	>9	5p	2
4568198963458261632	HD 155228	430.6	0.7	4.161	0.042	1.070	0.041	0.205	0.011	1.35	0	1.895	0.019	1.331	>9	5p	2
5306416671004618240	HD 82082	513.7	0.7	3.670	0.055	1.178	0.042	0.143	0.011	1.11	1	1.671	0.025	1.883	>9	5p	2
6017724140678769024	HD 148704	31.8	0.0	1.032	0.024	...	...	...	...	...	0	0.470	0.011	0.334	>9	5p	2
5547864407933928320	HD 67947	993.0	29.7	2.200	0.079	...	...	...	...	...	0	1.002	0.036	0.923	>9	5p	2
5629502218573747584	HD 81133	108.8	0.0	3.350	0.006	0.378	0.015	0.265	0.013	1.07	1	1.526	0.003	1.073	>9	5p	2
1918953867019478144	HD 221757	349.4	1.0	2.600	0.102	0.916	0.035	0.133	0.015	1.11	1	1.184	0.047	0.441	>9	5p	2
2162250505790084480	HD 199939	585.0	1.0	1.204	0.018	...	...	...	...	...	1	0.548	0.008	0.431	>9	5p	2
2983397469077381632	HD 34101	854.7	3.3	12.539	0.024	...	...	...	...	...	1	5.711	0.011	5.151	>9	5p	2
4994200964065634432	HD 3277	46.2	0.0	1.928	0.236	...	...	...	...	...	1	0.878	0.108	1.804	>9	5p	2
4254091856092504192	HD 175518	52.8	0.0	1.730	0.373	...	...	...	...	...	0	0.788	0.170	0.358	>9	5p	2
3638745672411053952	HD 117126	206.7	0.2	2.546	0.014	0.602	0.023	0.163	0.008	0.96	1	1.160	0.006	0.452	>9	5p	2
1905308073023457920	HD 211419	8.8	0.0	0.279	0.022	0.079	0.003	0.223	0.021	1.36	0	0.127	0.010	0.096	2.0	5p	2
4724313637321332864	HD 17289	562.1	0.4	9.788	0.032	...	...	...	...	...	0	4.458	0.015	4.895	>9	5p	2
3626268998574790656	HD 112758	103.3	0.0	3.495	0.136	...	...	...	...	...	1	1.592	0.062	2.646	>9	5p	2
4810832695483445760	HD 33115	270.3	0.2	1.399	0.016	...	...	...	...	...	1	0.637	0.007	0.534	>9	5p	2
4823703990915066880	HD 32491	85.5	0.1	0.200	0.161	...	...	...	...	...	1	0.091	0.073	0.205	6.3	5p	2
1014542369909518976	HD 73636	154.4	0.2	1.217	0.089	0.534	0.020	0.118	0.012	1.09	1	0.554	0.040	0.657	>9	5p	2
4133650458966620672	HD 151528	211.6	0.4	2.608	0.061	...	...	...	...	...	1	1.188	0.028	0.911	>9	5p	2
4650689681594278272	HD 40992	951.7	11.0	3.699	0.033	...	...	...	...	...	1	1.685	0.015	1.979	>9	5p	2
670216834655936128	HD 64468	161.3	0.4	4.370	0.073	...	...	...	...	...	0	1.991	0.033	1.905	>9	5p	2
4832672020067562624	HD 22705	204.1	0.1	4.015	0.016	0.574	0.023	0.249	0.013	1.01	1	1.829	0.007	1.612	>9	5p	2
409909484005053440	HD 8054	847.7	3.8	5.253	0.380	1.633	0.062	0.140	0.012	1.08	0	2.393	0.173	0.931	>9	5p	2

Table D.1: Continuing...

<i>Gaia</i> DR3 ID	Alias	Period <sup>(a)</sup> d	$\sigma_P$ d	$\alpha_\star$ <sup>(b)</sup> mas	$\sigma_{a,\star}$ mas	$q_{pl}$ AU	$\sigma_{apl}$ AU	$q$	$\sigma_q$	$M_{\star,Flame}$	SB <sup>(c)</sup>	$\alpha_{UEVA,H23}$ mas	$\sigma_{\alpha,H23}$ mas	$\alpha_{UEVA,ruwe}$ mas	$s_{\alpha,ruwe}$ $N - \sigma$	dataset	$\widetilde{M}_c^{(d)}$ (5p/6p) index
1067685718250692352	HD 79968	30.5	0.0	0.741	0.023	0.164	0.006	0.214	0.013	0.99	0	0.337	0.011	0.243	>9	5p	2
4597154602175212672	V* V834 Her	181.9	0.3	0.250	0.017	...	...	...	...	...	0	0.114	0.008	0.161	4.8	5p	2
1436561046051723648	HD 164330	316.2	0.6	1.471	0.103	0.887	0.033	0.116	0.013	1.19	1	0.670	0.047	0.942	>9	5p	2
4949308041743808384	HD 17354	821.1	1.9	7.451	0.038	1.443	0.061	0.285	0.017	1.09	1	3.393	0.017	3.346	>9	5p	2
5645712490304616320	HD 73438	864.3	5.1	3.627	0.038	...	...	...	...	...	1	1.652	0.017	1.962	>9	5p	2
1401541841225053696	HD 140208	325.2	1.2	3.949	0.021	...	...	...	...	...	0	1.799	0.010	1.598	>9	5p	2
1215279005201870336	HD 135991	151.1	0.2	1.963	0.026	0.507	0.020	0.167	0.009	1.07	1	0.894	0.012	0.786	>9	5p	2
5545537291566200320	HD 65721	835.8	4.9	13.945	0.020	...	...	...	...	...	1	6.351	0.009	4.329	>9	5p	2
2035577729682322176	HD 226099	18.8	0.0	0.803	0.021	...	...	...	...	...	0	0.366	0.010	0.343	>9	5p	2
3914521949074389632	HD 100069	24.2	0.0	0.393	0.090	0.152	0.008	0.199	0.046	1.21	0	0.179	0.041	0.096	1.6	5p	2
5997977839551049216	HD 142945	225.2	0.5	6.077	0.059	0.580	0.025	0.356	0.019	1.10	0	2.768	0.027	1.949	>9	5p	2
4556905020537693696	HD 158573	641.1	2.0	4.815	0.020	...	...	...	...	...	0	2.193	0.009	1.557	>9	5p	2
1484569984328261632	HD 125607	577.0	0.8	3.291	0.023	...	...	...	...	...	1	1.499	0.011	1.558	>9	5p	2
5065735499806985856	HD 16784	125.0	0.1	2.609	0.172	0.396	0.017	0.311	0.026	1.02	0	1.188	0.078	0.825	>9	5p	2
4296383402592198016	HD 183162	923.5	10.9	6.543	0.073	1.619	0.063	0.215	0.012	1.04	0	2.980	0.033	2.285	>9	5p	2
529406956772083968	HD 63581	1472.6	0.2	12.485	3.392	2.114	0.107	0.179	0.049	0.85	0	3.112	0.994	3.032	>9	5p	2
4552227182675443584	HD 161479	10.2	0.0	0.464	0.020	0.075	0.003	0.256	0.017	0.91	0	0.211	0.009	0.188	6.6	5p	2
797106798693569536	HD 85902	611.8	14.8	10.190	0.032	...	...	...	...	...	0	4.641	0.015	4.359	>9	5p	2
4594158089392172928	HD 160508	178.7	0.3	0.987	0.769	0.609	0.059	0.162	0.125	1.32	1	0.450	0.350	0.465	>9	5p	2
4517375515957545216	UCAC4 543-085881	231.7	1.5	0.301	0.014	...	...	...	...	...	0	0.137	0.006	0.107	6.1	5p	2
426186585428243840		693.3	9.2	0.320	0.010	...	...	...	...	...	0	0.146	0.005	0.136	>9	5p	2
5545870301853637504		437.1	8.9	0.228	0.011	...	...	...	...	...	0	0.104	0.005	0.100	5.4	5p	2
2274022837765746304		145.7	1.2	0.407	0.014	0.438	0.021	0.495	0.031	1.54	0	0.186	0.006	0.253	>9	5p	2
5431358403498310656		733.3	17.6	0.478	0.012	...	...	...	...	...	0	0.218	0.006	0.285	>9	5p	2
6350499649858805120	UCAC4 038-016236	162.1	1.0	0.296	0.014	...	...	...	...	...	0	0.135	0.006	0.153	>9	5p	2
2075978592919858432	Kepler-1648	840.0	22.0	0.424	0.021	1.720	0.081	0.271	0.021	1.70	0	0.193	0.010	0.229	>9	5p	2
2055801936074059264		613.6	11.7	0.490	0.013	1.432	0.072	0.417	0.029	2.57	0	0.223	0.006	0.231	>9	5p	2
2009052252148821632	UCAC4 732-093371	630.6	9.4	0.252	0.012	...	...	...	...	...	0	0.115	0.006	0.108	6.8	5p	2
5941647007018169728		834.2	70.8	0.529	0.023	...	...	...	...	...	0	0.241	0.011	0.130	>9	5p	2
513567110946268544		299.6	3.3	0.405	0.017	...	...	...	...	...	0	0.185	0.008	0.117	>9	5p	2
5220689364275188224	V* WZ Vol	226.2	0.1	0.712	0.036	...	...	...	...	...	0	0.324	0.016	0.340	8.1	6p	2
5534280594604579584	HD 65849	175.5	0.1	1.640	0.027	0.532	0.020	0.204	0.011	1.00	0	0.747	0.012	0.777	>9	6p	2
4830490966955576960	HD 25579	693.7	2.7	4.761	0.060	1.228	0.054	0.294	0.022	0.95	1	2.168	0.027	1.764	>9	6p	2
2633003866585490944	TYC 5257-509-1	494.3	4.5	0.269	0.024	...	...	...	...	...	0	0.123	0.011	0.115	2.8	6p	2
6685418107226825216	HD 186651	554.1	0.9	8.249	0.019	1.151	0.046	0.222	0.012	1.06	1	3.757	0.009	3.048	>9	6p	2
1615450866336763904	HD 137687	390.3	0.2	10.238	0.025	...	...	...	...	...	1	4.663	0.011	3.645	>9	6p	2
3937211745905473024	HD 114762	83.9	0.0	1.797	0.068	0.336	0.013	0.180	0.011	1.05	0	0.819	0.031	0.727	>9	6p	2
6345896578791113472	HD 166066	170.8	0.1	2.673	0.010	0.498	0.021	0.298	0.015	1.06	1	1.217	0.005	1.186	>9	6p	2

**Notes.** <sup>(a)</sup> Literature-based value whose references can be found in Holl et al. (2023). <sup>(b)</sup> By default the sma of the photocenter astrometric orbit taken from the CDS Vizier catalog of the *Gaia*-NSS 1/357. If the SB flag is '1', then sma<sub>\*</sub> refers to that of the primary star's orbit multiplied by the parallax. <sup>(c)</sup> The SB flag '0' = True or '1' = False indicates if the system was determined as spectroscopic binary using the RVs. For those, the sma of the primary's orbit was published. <sup>(d)</sup> The pseudo-mass index defined in Holl et al. (2023).

## Appendix E: Individual PMEX maps with RUWE or PMa

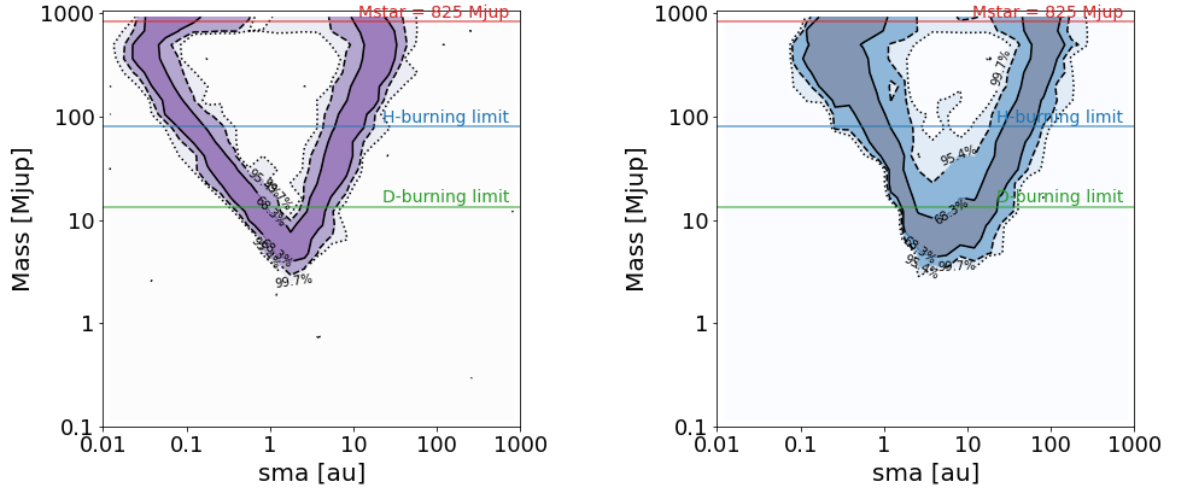


Fig. E.1: GaiaPMEX maps for HD 40503 based on ruwe (left panel, purple) and PMa (right panel, blue).

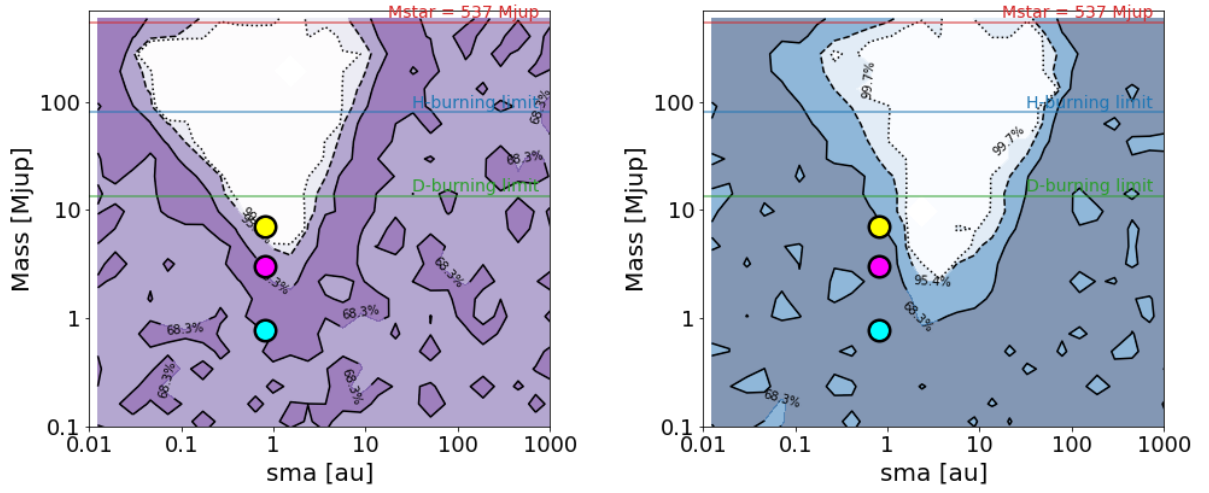


Fig. E.2: Same as Fig. E.1 for HIP 66074. The points indicate the possible solutions for HIP 66074 b based on astrometry only (yellow), RV only (cyan) or combination of both (pink), as explained in Fig. 9 and Section 4.1.

## Appendix F: PMEX maps of 259 HIPPARCOS sources



Fig. F.1: PMEX maps for the HIPPARCOS sample with the significance of  $\alpha_{\text{PMa}}$  greater than  $3\text{-}\sigma$ , combining, when possible, the constraints from ruwe and PMa.





Fig. F.1: Continued.



Fig. F.1: Continued.

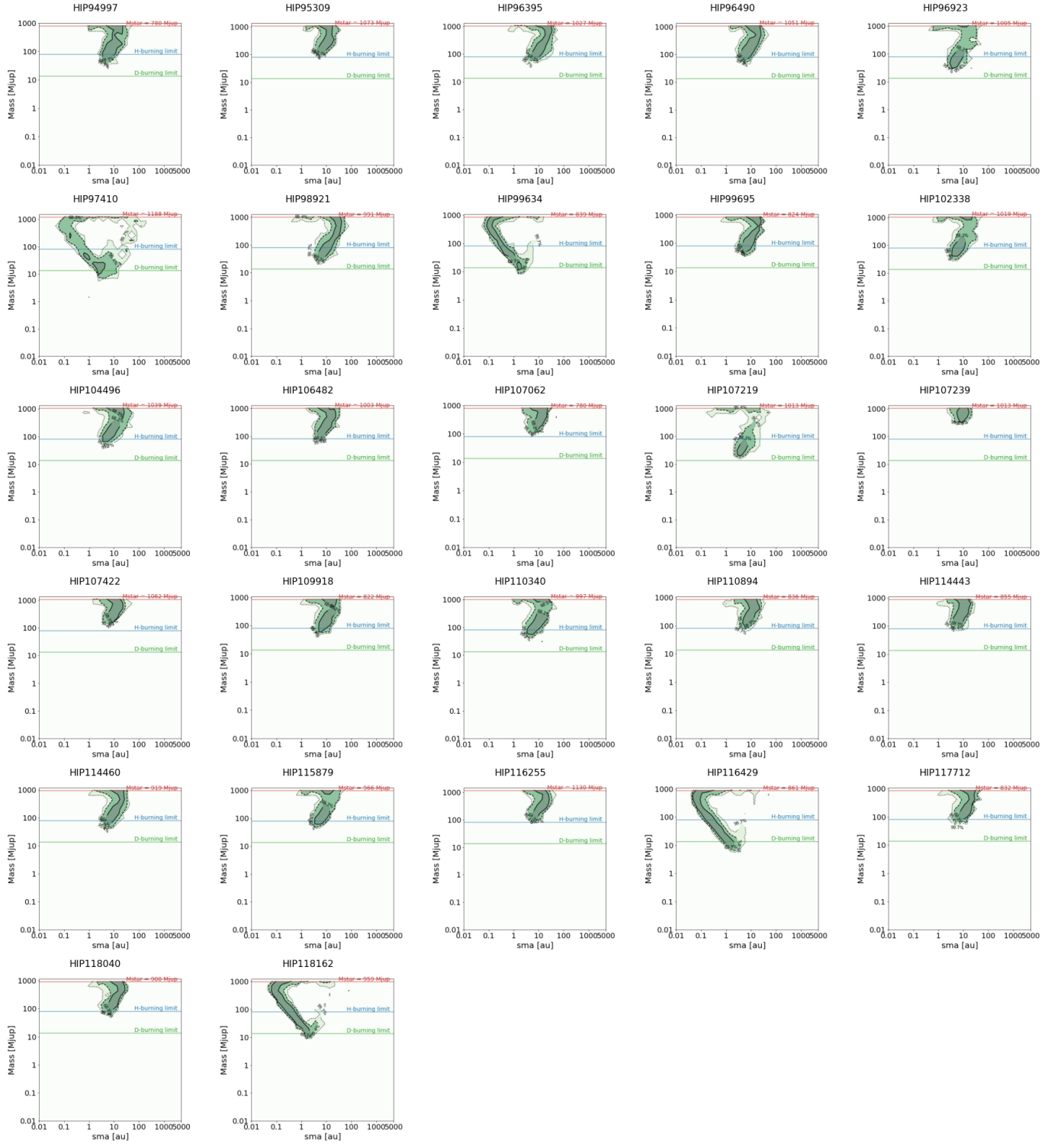


Fig. F.1: Continued.