

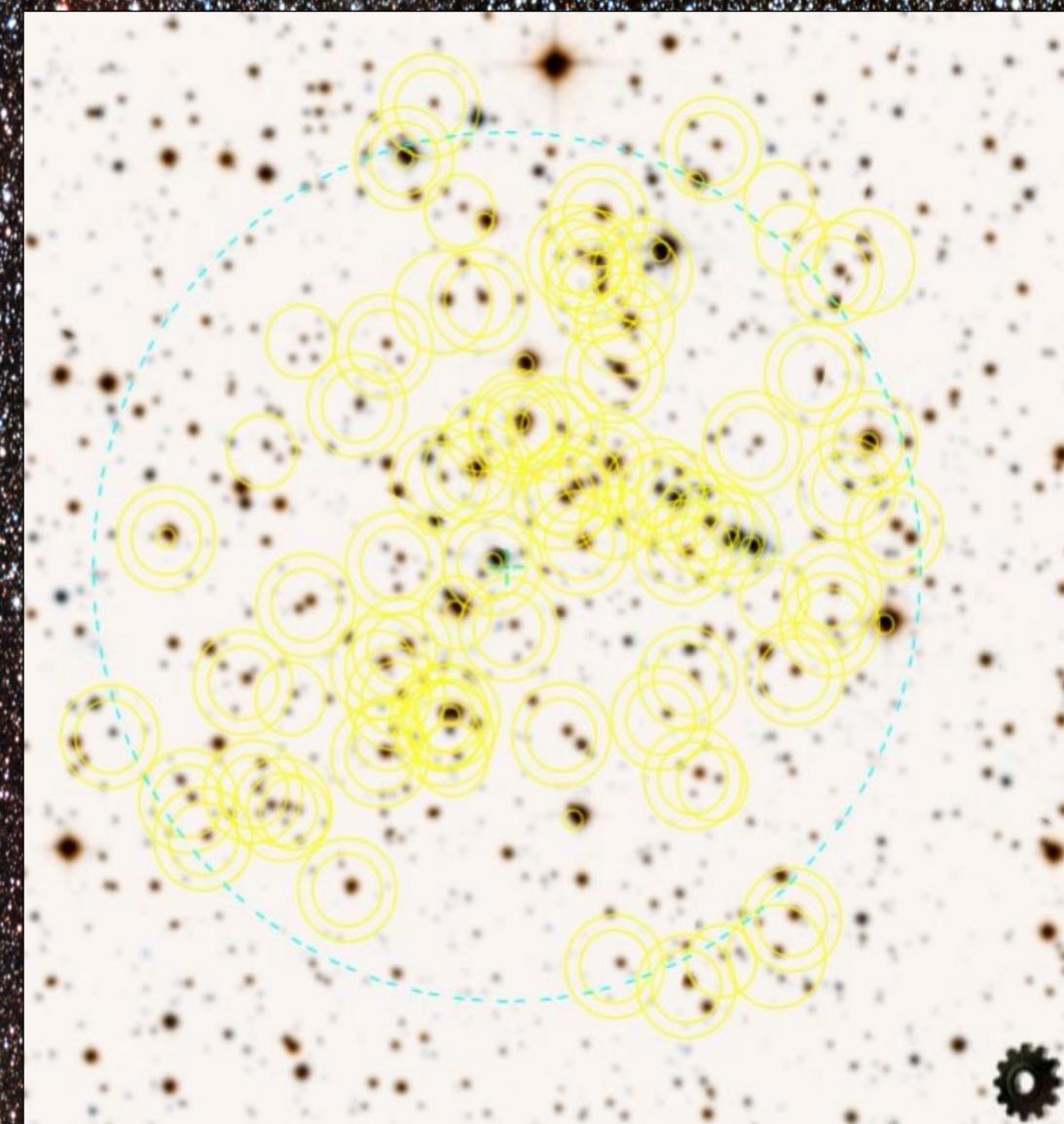
Study for variable stars in King 18

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Open star clusters provide a good ground to study the evolution of stars, since all cluster member stars were formed from the common parent molecular cloud, which causes them to lie at approximately the same distance, they have the same age, and chemical composition but various masses. This allows constraints on the models of stellar evolution and estimate their age, distance and interstellar extinction in the direction of the cluster by comparing the colour-magnitude diagram (CMD) and colour-colour diagram (CCD) of star clusters with theoretical evolutionary models. To derive the cluster physical parameters, the knowledge of membership of the stars is essential. An analysis of kinematics of stars, especially of their proper motion (PM) data, is a quite reliable method for determining the cluster membership. In other words, exploring clusters in this way allows you to take a snapshot of evolution of whole populations of stars in the cluster.

King 18 is an open star cluster discovered by King (). This cluster is of middle age located at a distance of about 2.4 kpc in the northern hemisphere [RA (J2000.0) = 22h52m06s, Dec (J2000.0) = +58°17'00'].

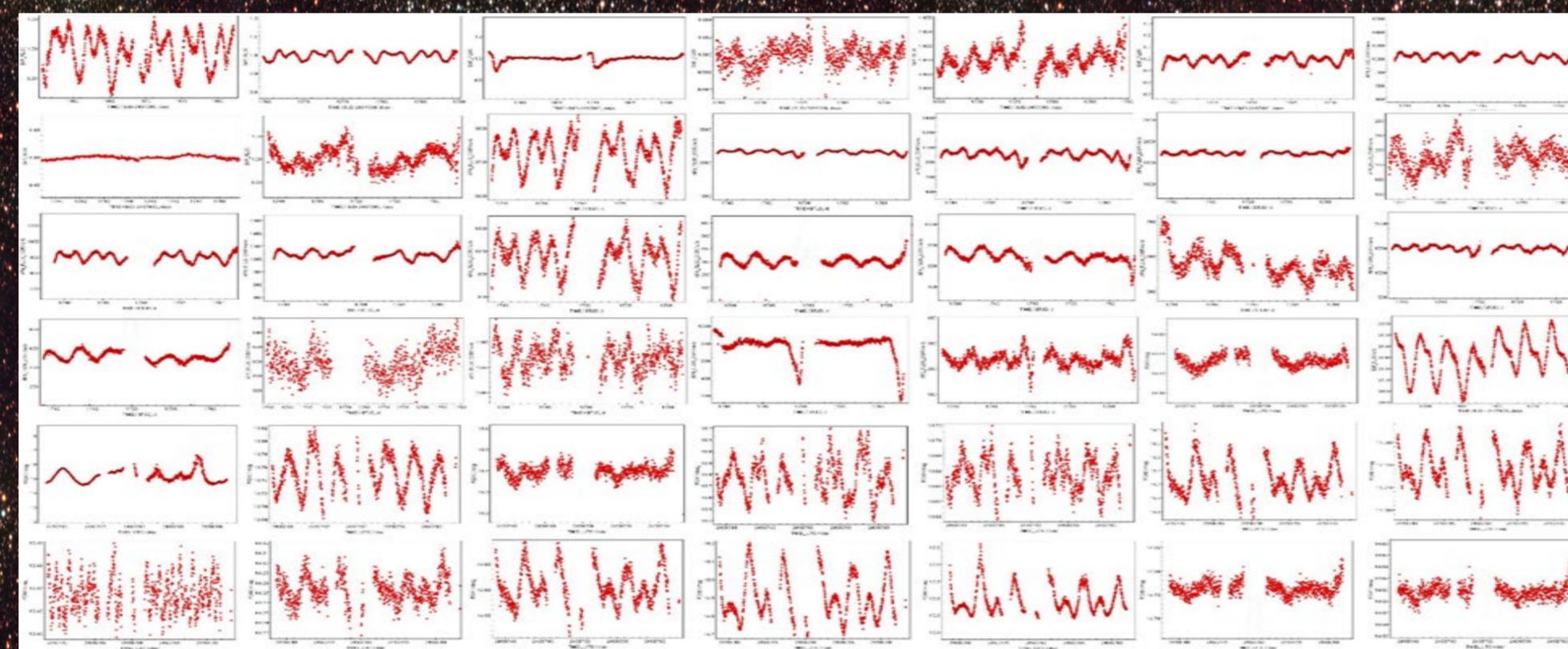


Observational Data and Analysis

To search for variable stars, the TESS mission data were used: the field of view with the marked stars that made up the initial sample of objects for the analysis of their light curves, for each of which the time series available in the database were loaded and analyzed, is shown in Fig.

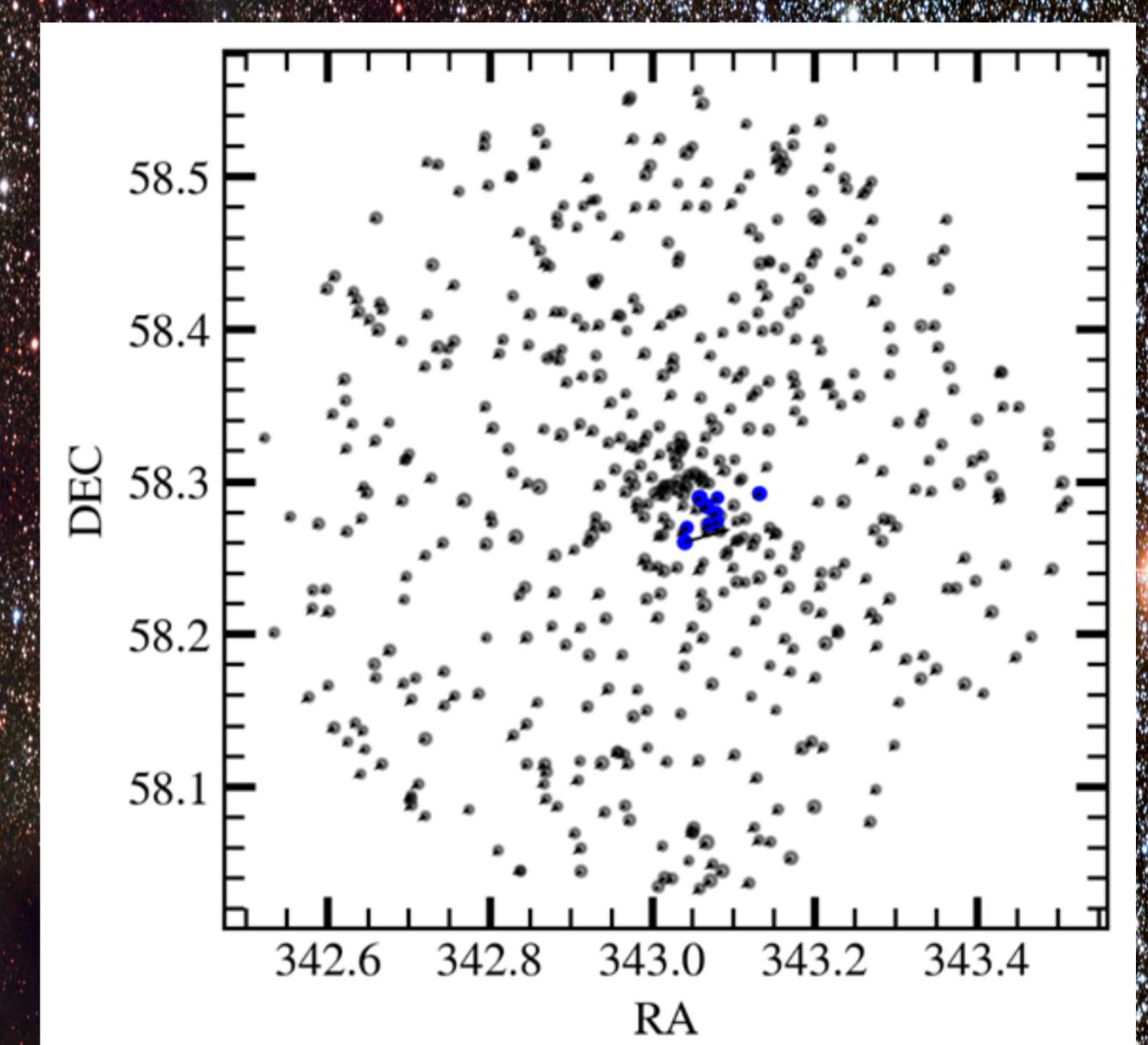
Preliminary list of possible variable stars in the King 18 region and their lightcurves

processing package	Var ID	RA	DE
Qlp	1	343,0126	58,33246
Cdips	56	343,0344	58,3287
Qlp	21	343,0204	58,32465
Cdips	49	343,0394	58,32407
Cdips	48	343,0357	58,3235
Cdips	54	342,974	58,32348
Pathos	7	343,0242	58,32249
Pathos	12	342,9995	58,30296
Qlp	40	343,0177	58,29655
Pathos	18	343,0306	58,29399
Pathos	19	343,0104	58,29391
Qlp	6	343,0047	58,29223
Pathos	22	343,0386	58,29171
Qlp	27	342,9697	58,28248
Pathos	28	343,0141	58,27631
Pathos	29	343,0202	58,27187
Pathos	30	343,0129	58,26512
Cdips	10	342,9907	58,24907
Pathos	33	343,0065	58,2444
Pathos	34	343,0307	58,24379
Cdips	7	343,0144	58,24156
Cdips	3	343,0911	58,25246
Spoc	7	343,0401	58,26039
Pathos	43	343,0836	58,26766
Pathos	46	343,0427	58,26999
Pathos	47	343,0819	58,2701
Cdips	24	343,0701	58,27206
Qlp	10	343,0678	58,27213
Pathos	51	343,08	58,27411
Cdips	23	343,0837	58,27766
Cdips	21	343,0787	58,27966
Cdips	13	343,0546	58,28191
Qlp	30	343,0669	58,28406
Cdips	29	343,0803	58,28943
Cdips	28	343,0583	58,28943
Cdips	27	343,1321	58,29222
Qlp	48	343,0723	58,29374
Pathos	61	343,0401	58,29807
Pathos	62	343,0701	58,29895
Pathos	63	343,0625	58,29997
Cdips	65	343,0724	58,34111
Pathos	76	343,0664	58,28378

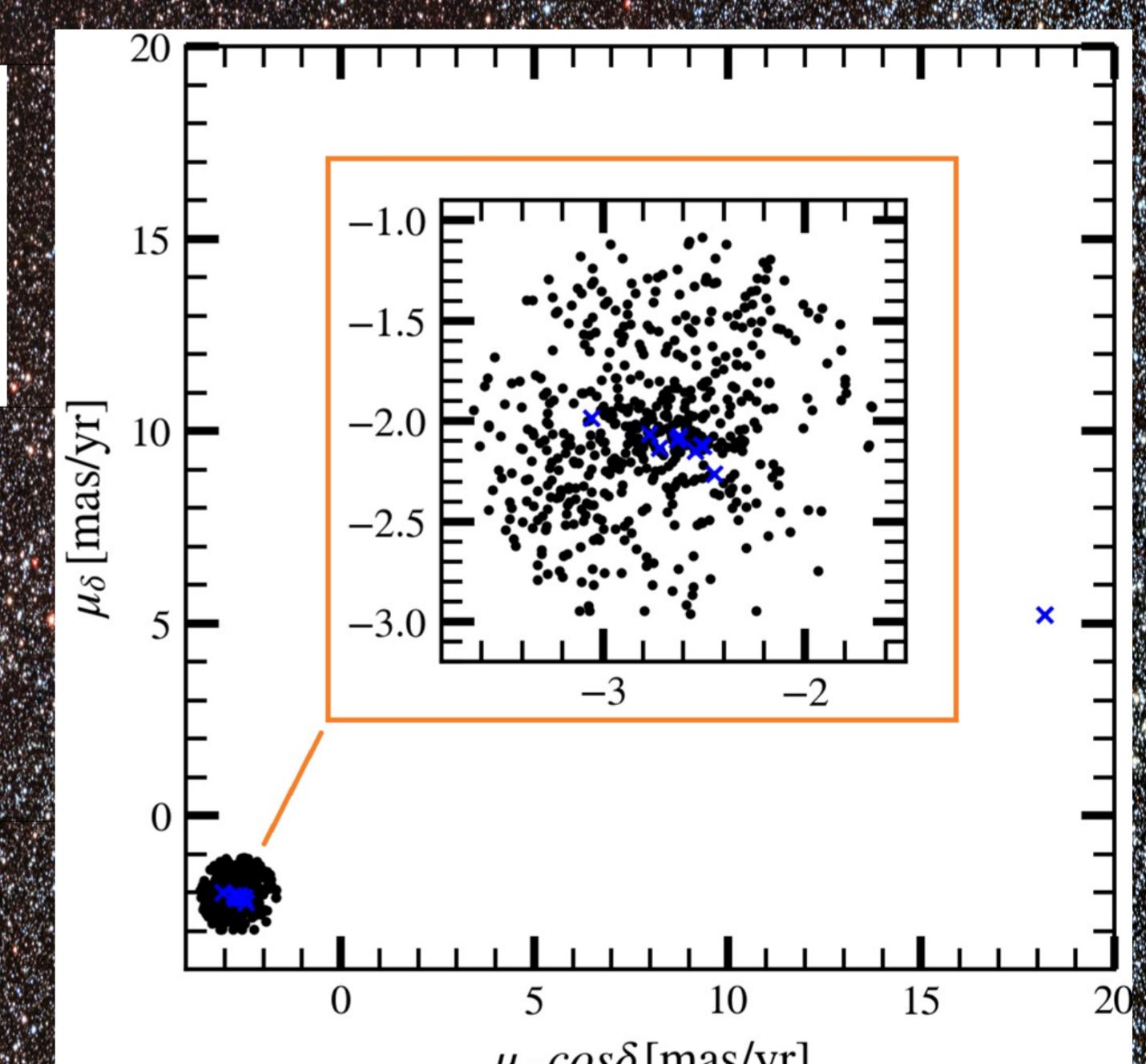
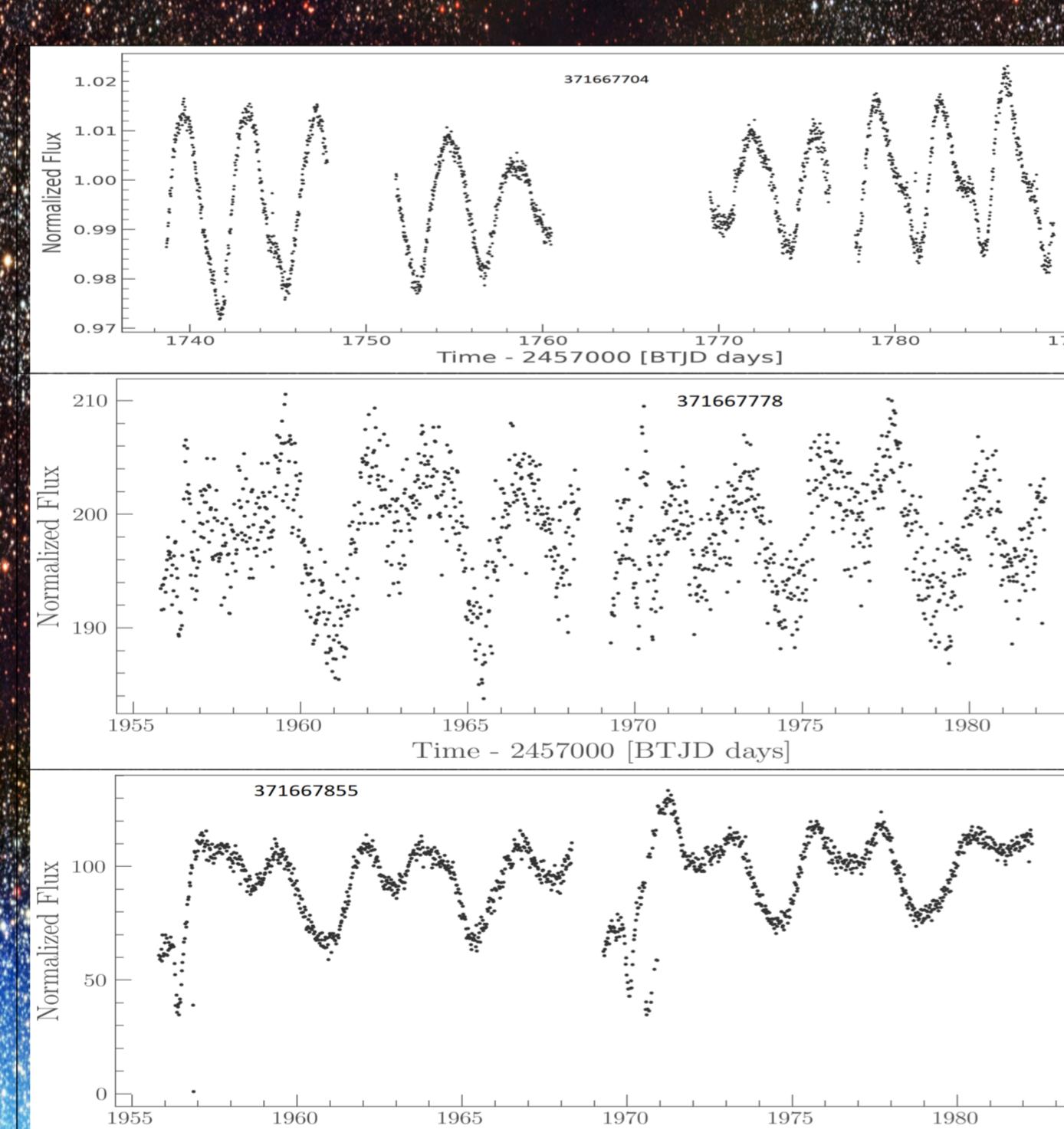


Short-List of probable variable stars in the King 18 region

#	ID	RAdeg	DEdeg	Gmag	e_Gmag	P (d)	Ph	Q
1	371667757	343,0427107	58,26999	15,974	6,00E-04	3,568096	2P	1
2	371667855	343,0802586	58,28943	16,3217	6,00E-04			
3	371667765	343,0701191	58,27206	14,7277	3,00E-04	2,274544	2P	
4	371667704	343,0400798	58,26038	12,3190	0,003443			
5	2046865963.	343,0663735	58,28378	14,9265	0,0026	2,272156	2P	
6	371667801	343,0786998	58,27966	15,3368	4,00E-04	2,277009	2P	
7	371667825	343,066923	58,28406	12,5417	0,002891	2,272171	2P	
8	371667869	343,1320642	58,29222	13,8927	6,00E-04	0,875657	2P	
9	371667856	343,0582995	58,28943	12,2359	3,00E-04	2,271422	2P	
10	371667778	343,0800475	58,27411	16,5549	8,00E-04			



#	ID	Plx	e_Plx	pmRA	e_pmRA	pmDE	e_pmDE	Pmemb
1	371667757	0,3606	0,0398	-2,945	0,072	-2,015	0,065	0,4
2	371667855	0,3139	0,0496	-2,768	0,09	-2,089	0,083	0,6
3	371667765	0,2769	0,0238	-2,656	0,043	-2,095	0,04	1
4	371667704	5,0215	0,0102	18,205	0,011	5,243	0,011	
5	2046865963	0,2612	0,0515	-2,535	0,089	-2,144	0,094	0,9
6	371667801	0,3054	0,0292	-2,543	0,054	-2,12	0,049	1
7	371667825	0,5138	0,1265	-3,055	0,144	-1,984	0,132	
8	371667869	0,2619	0,0192	-2,83	0,04	-2,031	0,033	0,4
9	371667856	0,3142	0,0295	-2,478	0,062	-2,114	0,047	0,8
10	371667778	0,2822	0,0576	-2,508	0,113	-1,985	0,092	0,7



This cluster is relatively poorly studied. The main parameters of the cluster were derived by Tadross (2008), Maciejewski (2008), Glushkova et al.(2010). In 2003 we carried out the continuous monitoring (patrolling) a sample of 7 unstudied open star clusters including King 18 to take the dense time-series and had suspected some variables (Hojaev, 2005). This work is continuation of research initiated twenty years ago.

References

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