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SEARCH FOR B-TYPE VARIABLE STARS IN OPEN CLUSTERS

The search for δ Cephei stars in open clusters and OB associations can provide valuable information, in order to get a reliable observational definition for this type of variable stars. After the pioneer work of Hill (1967), some astronomers have pointed out the significance of these searches, which have been up to now mostly restricted to clusters in the southern hemisphere. We have started an observational program for northern clusters, which has already produced the first results (Delgado et al., 1984). The clusters listed in the table deserve a particular attention in this respect. They have been selected from the catalogues of Becker and Fenkart (1971), Mermilliod (1976) and Lyngå (1981), according to the following criteria:

- Observable from our latitude (37° N)
- Magnitude of brightest star < 10
- Earliest spectral type between O6 and B4
- Included in one of those age groups of Mermilliod (1981), containing clusters with already detected B-type variable members

The second criterium is imposed by our instrumental capabilities. However, a number of clusters large enough can be selected. The table contains the number of the cluster in the NGC or IC catalogues, the coordinates (equinox 1950.0), the youngest spectral type, the magnitude of the brightest member and the logarithm of the age in years. An asterisk indicates that some members of the cluster are confirmed or suspected variables.

Number	Alpha	Delta	ST	m	Log age	Ref.
NGC 457	01 15.9	+58 04	B1	6	7.40	
581	01 29.9	+60 27	B2	9	7.35	
637	01 39.4	+63 55	B0	8		
654	01 40.6	+61 38	B0	10	7.18	
663	01 42.6	+61 00	B0	9	7.35	
869(*)	02 15.5	+56 55	B0	7	6.75	1,2,3
884(*)	02 18.9	+56 53	B0	7	6.50	1,2,3
1502(*)	04 03.3	+62 12	B0	7	7.30	1
1960	05 32.8	+34 06	B3	9	7.40	
2169(*)	06 05.6	+13 58	B1	7	7.70	1
2244	06 29.7	+04 54	O5	7	6.48	
2264	06 38.3	+09 56	O8	5	7.30	
6823	19 41.0	+23 11	O7	9	6.30	
6830	19 48.9	+22 56	B0	10	8.0	
6871(*)	20 04.0	+35 58	O6	7	7.0	4
6883	20 09.4	+35 42	B3	8	7.17	
6910	20 21.3	+40 37	B0	7	7.0	
6913	20 22.1	+38 22	B0	9	7.0	
7160(*)	21 52.3	+62 22	B2	7	7.0	1
7235	22 10.8	+57 02	B0	9	6.3	
7380	22 45.0	+57 50	O9	10	6.58	
7510	23 09.4	+60 18	O9	10	7.0	
7788	23 54.2	+61 07	B1	10	7.2	
7790	23 55.9	+60 56	B4	10	7.82	
IC 1805	02 28.9	+61 14	O6	9	6.12	
4996(*)	20 14.6	+37 29	B0	8	7.0	5

- 1.- G. Hill, 1967: *Astrophys. J. Suppl.*, 14, 237
- 2.- J.R. Percy, 1972: *Pub. Astron. Soc. Pacific*, 84, 420
- 3.- R. Garrido and A.J. Delgado, 1982: *IBVS*, No.2080
- 4.- A.J. Delgado et al., 1984: *Astron. Astrophys. Suppl.*
In press
- 5.- A. J. Delgado et al., 1984: In preparation

In our opinion, the systematic performance of such observations should clarify two main problems related to β Cephei stars:

1/ Precise determination of the zone in the HR diagram, in which B-type variable stars are found. This obviously leads to the knowledge of the evolutionary status of the β Cephei stars and to defining the limits of the instability strip or box, if any.

2/ Possibility of establishing a period - luminosity or period - luminosity - colour relation for stars of the same age and chemical composition and of testing the possible dependence of this relation on the parameters of the cluster.

As mentioned before, we are presently carrying out observations on the clusters listed in the Table. Any information concerning the member stars of these clusters should be acknowledged by the authors.

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