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WEBDA - a tool for CP star research in open clusters

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Abstract. WEBDA (http://www.univie.ac.at/webda) is a site devoted to stellar observational data, such as chemically peculiar stars, in stellar clusters in the Milky Way and the Small Magellanic Cloud. It is intended to provide a reliable synthesis of the available data and knowledge about these objects. The success of WEBDA is documented by its worldwide usage and the related acknowledgements in the literature: more than 450 refereed publications within the last seven years acknowledge its use. It collects all published data for stars in open clusters that may be useful either to determine membership, or to study the stellar content and properties of the clusters. The database content includes measurements in most photometric systems in which cluster stars have been observed, spectroscopic observations, astrometric data, miscellaneous other useful information, as well as an extensive bibliography. Several powerful tools help to plot, query and extract the data, which can be directly retrieved via http. At the time of writing, about four million individual measurements are included in the database. The Star Clusters Young & Old Newsletter (SCYON), a bimonthly newsletter devoted to star cluster research with about 600 subscribers, is hosted in parallel with the database.

Key words: Galaxy: open clusters – astronomical data bases: miscellaneous – stars: chemically peculiar

1. Star clusters - why are they unique?

Open clusters are groups of physically-related stars held together by mutual gravitational attraction. An open cluster populates a limited region of space, typically much smaller than its distance from the Sun, so that the members are all located at approximately the same heliocentric distance. They are believed to originate from large cosmic gas and dust clouds (diffuse nebulae) in the Milky Way, and to continue to orbit the galaxy through the disk. Hence, star clusters are of great interest for scientists because the stellar members of individual clusters: 1) are all located at about the same distance from the Sun; 2) all have approximately the same age, within a few million years; and 3) have bulk chemical compositions that are quite homogeneous.

Distance, age and metallicity are not, in general, straightforward to determine for galactic field stars. Star clusters, on the other hand, represent samples of stars of uniform age and homogeneous chemical composition, suited for the study of processes linked to stellar structure and evolution, and to fix lines or loci in several of the most important astrophysical diagrams such as the color-magnitude diagram, or the Hertzsprung-Russell diagram.

2. Why observe members of star clusters?

From kinematic and photometric studies we are able to establish the membership of a star in an open cluster rather accurately. Several new catalogues are now available in this respect (e.g. Dias *et al.*, 2006).

If we are able to establish the cluster membership of a CP star, we can obtain its age, distance, reddening as well as (to some extent) the overall metallicity and thus its mass "for free" from the cluster analysis. Such an analysis is always based on the isochrone fitting technique (Jørgensen, Lindegren 2005). Extensive grids of stellar tracks covering the most important evolutionary phases and a large metallicity range are available. This method simultaneously incorporates information about all of the members of the cluster, making it statistically very significant. Recently, Paunzen and Netopil (2006) have summarized our current knowledge of the published cluster parameters on the basis of a statistical analysis.

3. Why use WEBDA?

The database for star clusters (Mermilliod, Paunzen 2003) will provide the database of published data and an extensive suite of tools (for example plotting isochrones directly to the photometric data) to derive and extract all data as well as parameters. There are many data sets which are only available within WEBDA and not in ADS/SIMBAD. The bibliography and the included catalogues are excellent starting points for further data mining.

WEBDA also contains a list of known Am/Ap stars (among several other groups) which are located within the boundaries of clusters.

Any feedback to further improve the database would be greatly appreciated.

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