The Carina Dwarf Galaxy Variable Star Population

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Abstract. We present some preliminary results based on new observations of the variable stars belonging to the Carina Dwarf Galaxy (DG).
Photometric data were collected with the two wide field imagers available
at ESO (WFI@2.2.) and CTIO (4m prime focus).

1. Introduction

Carina is one of the most interesting Dwarf Spheroidal Galaxies (dSphG) of the
Local Group, due to the complexity of its star formation history, to its peculiar
kinematic properties, and to the presence of several types of variable stars (RR
Lyrae, Anomalous Cepheids (AC), Dwarf Cepheids).

Even though it is relatively close ($\sim$ 100 Kpc), Carina has been poorly
investigated due to its large dimensions on the sky (tidal radius $\sim$ 28.8 arcmin).

Concerning variable stars, the only systematic investigation on a large area
($\sim$ 1 sq. degree) was performed by Saha et al. (1986) and relies on B-band photographic plates. They found 58 RR Lyrae and 8 ACs. Subsequent observations
based on CCD data led to the discovery of a sizable sample of Dwarf Cepheids
(20, Mateo et al., 1998).

On the basis of these facts, we decided to undertake an observing campaign
by means of wide field imagers such as the WFI at 2.2m telescope (ESO, Chile)
and the Mosaic Camera at 4m telescope (CTIO, Chile). As a result we collected
approximately 110 *BV* pairs.

In the following Section we briefly outline the results obtained from the
complete reduction of the ESO data ($\sim$ 54 *BV* pairs). Firmer conclusions will
be drawn as soon as the whole data set will be fully reduced. These results will
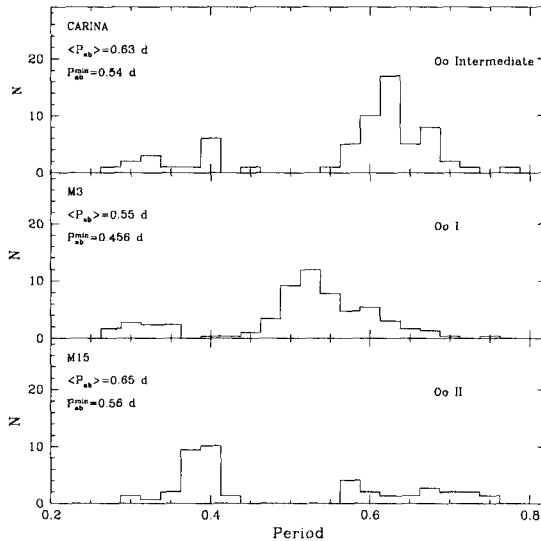be published in a forthcoming paper.

Figure 1.   Period distribution of Carina RR Lyrae (top panel) in comparison with the M3 and M15 ones (middle and bottom panels).

2.   Results

The Carina variable stars inventory includes up to now: 71 RR Lyrae, 12 ACs, 1 foreground RR Lyrae, 2 eclipsing variables and 1 short period unclassified red pulsator. Among these variables, 26 RR Lyrae, 4 AC and the variables of different type are newly discovered. The Saha et al. (1986) RR Lyrae sample is therefore incremented by $\sim$40%. Concerning the RR Lyrae, we have found 49 type ab and 15 type c pulsators, whereas 7 variables are suspected to be double mode RR Lyrae. Fig. 1 shows the period distribution of Carina RR Lyrae (top panel) together with the comparison with the period distribution of RR Lyrae in M3 (middle panel) and M15 (bottom panel). Data plotted in this figure clearly show that the shape of the histogram and the ratio between fundamental and first overtones (RRc/RRab) are similar to the ones in Globular Cluster (GC) M3 (Oosterhoff I type GC). Moreover, the minimum fundamental period (P_{ab}^{min}) is similar to the M15 one (Oosterhoff II type GC). On the other hand, the mean fundamental period $< P_{ab} > \sim 0.63$ d, is intermediate between the two Oosterhoff types. This evidence support the conclusion that Carina is "anomalous" as far as the Galactic Oosterhoff's groups is concerned.

References

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