The heart of Cassiopeia and the tadpoles of Auriga: a story of two stellar clusters

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Abstract

Massive stars play a crucial role in galaxy evolution, yet in spite of this importance the formation of high-mass stars is not a well-known process. From a theoretical point of view, there are three main hypotheses for their formation: a) monolithic collapse of protostellar cores; b) competitive accretion within a proto-cluster molecular cloud; and c) coalescence of protostellar cores and low-mass stars in very dense environments. It is obvious that the success of the proposed different scenarios for the formation of massive stars is going to depend on their Galactic location and on the properties of the molecular cloud where they have been formed. Likewise, the stellar population coeval to the massive stars will be strongly influenced by the dominant mechanism in the formation of their highest-mass stars. This means that the cluster members will show IMFs, spatial distribution according to mass, age spread and massive stars to pre-main-sequence stars ratios highly conditioned by the dominant mechanism in the formation of their most massive members.

Two years ago, the Stellar Systems Group of the Instituto de Astrofísica de Andalucía has begun an observational programme in the Sierra Nevada Observatory (OSN) and in the Nordic Optical Telescope (NOT) of stellar clusters containing massive stars, whose main objective is the characterization of their stellar population using $UBVRIH\alpha$ and $JHKs$ photometry to obtain the physical parameters of the cluster and to determine the Mass Function of the member stars, their spatial distribution by mass range and the quotient of populations of different masses and evolutionary states for two different environments: a) isolated clusters and b) clusters contained within more extensive stellar formation regions. In this poster, we present the first physical parameters calculated from the photometric study based in 6 colors for two clusters contained within star formation regions: IC 1805 and NGC 1893.