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Binaries in massive clusters with MUSE: Omega Cen and NGC 1850

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Binary systems are important constituents of massive star clusters. They have been invoked to play an important role in the origin of phenomena observed in these environments, such as the extended main-sequence turn-offs, and to lead to the formation of exotic objects (blue straggler stars, low-mass X-ray binaries, Be stars etc).
A detailed characterization of the orbital properties of binary systems in clusters is crucial information for understanding the frequency of interactions or mergers between binary components, as well as for predicting how many binary interaction products are expected in individual clusters. However, such observational studies have become possible only recently, thanks to the advent of integral field spectrographs (e.g. MUSE/VLT) which have been able to monitor the innermost regions of clusters over time to identify these systems.
To study how the orbital properties of binaries evolve in clusters of different ages, as well as to search for binary interaction products, we are currently conducting a large spectroscopic campaign with MUSE.
We recently investigated NGC1850 (~100 Myr in Large Magellanic Cloud) and Omega Centauri (> 12 Gyr in our Galaxy). For both we have more than 15 epochs of MUSE observations, covering a temporal sampling of over 2 and 8 years, respectively. This allows us to identify their binary systems and constrain their orbits.
I will present the results of this study, discussing the orbital properties of the constrained systems in NGC1850 and Omega Centauri and the differences between these two clusters in terms of their binary population (e.g. orbital period distribution, binary mass function etc.)
Such studies are essential to provide important constraints to the modelling of massive star clusters, with the aim of obtaining more robust predictions in terms of their stellar and non-stellar population content, which so far is still very approximate in clusters of all ages.

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