Previous work:

- The role of Type Ia supernovae on the formation of second generation stars in globular clusters: we studied the role of Type Ia supernovae on the formation of a very massive globular cluster focusing on their effects on the star formation and the chemical composition of newborn stars.

Ongoing works:

- The role of Type Ia supernovae on the formation of second generation stars in globular clusters of various masses: we want to follow up the previous work modelling globular clusters of lower masses to determine whether the star formation of the second generation can be ceased much faster and determine if iron spreads will emerge even at lower cluster masses.
- Ionising feedback effects on star formation in globular clusters: We plan to include photoionization both from massive and low mass stars. In the RAMSES code the radiation transfer is already implemented and well tested by many collaborators.
- On the role of globular cluster rotation on the second generation formation within globular clusters: we intend to study the effects of rotation on the star formation given the great importance of this physical process still poorly modelled in literature. Rotation has been found to leave kinematical imprints which can be used to distinguish between different multiple stellar population formation scenarios.
- Residual star formation of the first stellar generation within globular clusters: we intend to study whether star formation can proceed during the very early phases on globular cluster formation, when massive stars are undergoing the pre-supernova and supernova phase. The aim is to determine whether an iron spread appears in the newborn stars, which would explain the formation of Type II globular clusters, a subclass of systems which are showing an iron spread.

Future work:

- We will also study the mass loss of a massive globular cluster evolving in a Large Magellanic Cloud (LMC) potential composed by a dark matter halo, a bulge and a disk. In the LMC, it has been found that the fraction of first generation stars is much higher than in Galactic globular clusters becoming in some cases even the dominant component. The simulations will run using NBSymple a direct $N$-body code parallelized on graphic processing units. We will be able to investigate whether the environment plays a role on globular cluster mass loss, as suggested by observations.

## ACCEPTED COMPUTATIONAL PROPOSALS

- 2021 "Hydrodynamic simulations of proto-globular clusters: the role of Type Ia SNe" at CINECA (Italy), **5.2M CPU/h** on MARCONI 100, PI: Elena Lacchin
- 2020 "Hydrodynamic simulations of iron-complex clusters" at CINECA (Italy), **500k CPU/h** on GALILEO, PI: Elena Lacchin
- 2020 "Hydrodynamic simulations of Globular Clusters" at CINECA (Italy), **1M CPU/h** on MARCONI 100, PI: Elena Lacchin