The Big-Three Reactions for Astrophysics: 12C(α,γ)16O, 12C+12C fusion, 22Ne(α,n)25Mg

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Scientific Program

Reactions involved in the helium and carbon burning, such as the 12C(α,γ) and the 12C+12C fusion, are indispensable to determine the abundances of carbon and oxygen in our universe, critical to understand the formation of life on Earth and to the life cycles of stars, including cosmologically relevant type Ia supernovae. Another key process is the 22Ne(α,n) reaction, the neutron source driving the production of heavier nuclei in the so-called weak s-process in massive stars.
The main goal of the workshop is to network the existing and forthcoming research programs around the 12C(α,γ), 12C+12C and 22Ne(α,n) fusion reactions, with a focus on the 12C(α,γ), 12C+12C reactions, the third one being the topic of the related workshop https://agenda.infn.it/event/38003/.
As main follow up, review articles on these reactions are expected to be coordinated by the participants.
In each session, an experimental studies state-of-the-art and the astrophysical impact of the reaction will be pointed out, to help the addressing of next experiments and reaction rates will be evaluated, to be shared with the community.