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# (I) Laboratory Measurements of Stellar Nuclear Reactions

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Aside from the lightest elements, hydrogen, helium and some lithium, which were formed in the big bang, the vast majority of the elements around us were (and are) formed in stars, through chains of nuclear reactions and decays. While the general picture of how the various elements are formed is mostly complete, constructing a detailed understanding of element formation remains an active area of research. This includes building an understanding of the origin of elements heavier than iron, formed mainly in chains of neutron captures and beta decays such as the rapid and slow neutron capture processes. Other active areas of investigation include the formation of elements, both heavier and lighter in hydrogen, in stellar explosions such as novae, x-ray bursts, and supernovae. These scenarios typically involve rapid chains of proton or alpha capture reactions followed by beta decays.

Forming a complete understanding of stellar nucleosynthesis requires complex modelling of stellar processes, and a key ingredient in these models are the rates of the nuclear reactions involved. In turn, constraining these rates requires input from nuclear physics, including laboratory measurements of important reactions using stable and radioactive beam facilities. In this talk, I will discuss some of the forefront techniques used to understand stellar nuclear reactions through accelerator-based measurements, including both direct and indirect measurements. As illustrative examples, I will discuss the results of some recent experiments exploiting these techniques, as well as future efforts on the horizon. I will also present some of the latest developments in experiment design and detector technology, which will be applied to future measurements.

## Keyword-1

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## Keyword-2

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## Keyword-3

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