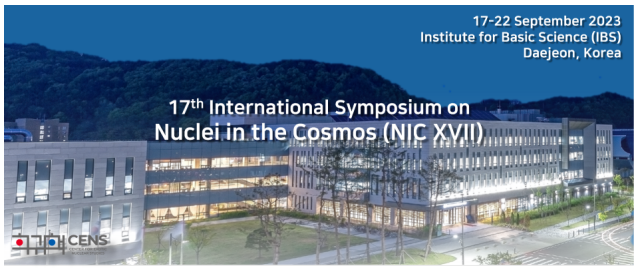

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Nucleosynthesis and stellar evolution in 3D hydrodynamic simulations

Thursday, 21 September 2023 14:45 (15 minutes)

Our knowledge of stellar evolution is limited by uncertainties coming from complex multi-dimensional processes in stellar interiors, usually reproduced in 1D stellar models with simplifying prescriptions. 3D hydrodynamic models can improve these prescriptions by studying realistic multi-D processes, usually for a short timerange (minutes or hours). Recent advances in computing resources are starting to enable 3D models to run for longer time and include nuclear reactions, making the simulations more realistic and allowing to study the effects of nuclear reactions on the stellar evolution.
In this talk, I will present results coming from a new set of hydrodynamic simulations of a massive-star burning shell, run continuously from early development to fuel exhaustion, and including different nuclear species. I will discuss the implications for stellar nucleosynthesis, convective boundary mixing, and the possibility of deriving simplifying laws that can be used in 1D stellar models.

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