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The Role of Carbon-Oxygen Shell Interactions in the Nucleosynthesis and Final Fate of Massive Stars

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Carbon-oxygen (C-O) shell interactions in the late evolutionary stages of massive stars play a crucial role in determining their final fate and have a significant impact on the pre-supernova and explosive nucleosynthesis. In this talk, I will explore the complex dynamics within C-O shells, and how these interactions drive the production of intermediate and heavy elements. In particular I will address how stellar models experiencing a C-O shell merger can efficiently produce odd-Z nuclei such as P, Cl, K, and Sc, and the radioactive species ^{44}Ti . I will then outline how the occurrence of such a merger would favour the successful explosion of a massive star, leading to the enrichment of the interstellar medium with peculiar nucleosynthetic signature.

Author: ROBERTI, Lorenzo (Laboratori Nazionali del Sud)

Presenter: ROBERTI, Lorenzo (Laboratori Nazionali del Sud)

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