THE IMPACT OF CARBON-OXYGEN SHELL MERGER ON INTERMEDIATE-MASS ELEMENTS IN MASSIVE STARS :

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INSIGHTS FROM IMPROVED CONVECTIVE BOUNDARY MIXING MODEL

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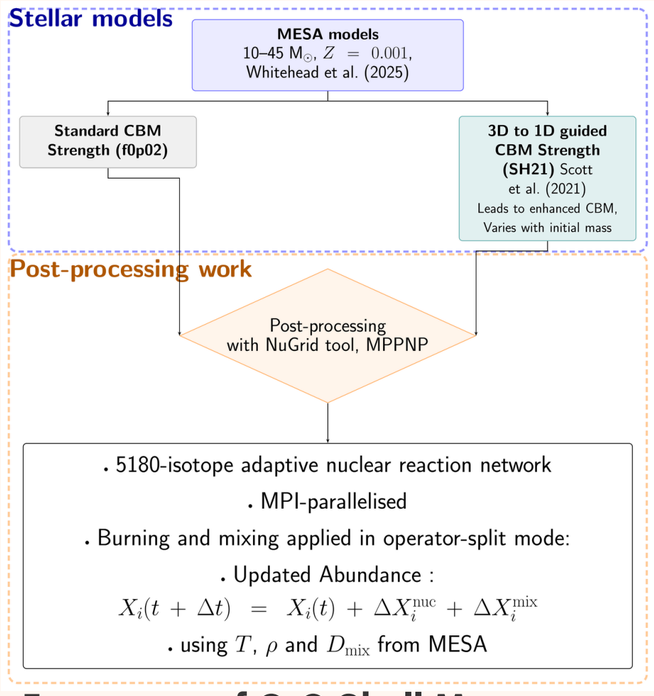
1 MOTIVATION

Standard massive-star models underproduce odd-Z elements (P, Cl, K, and Sc) at low metallicity compared with observations.

2 AIMS

Investigate the impact of the Convective Boundary Mixing **(CBM)** prescription motivated by 3D hydrodynamic simulations, on the role of **C-O shell merger** in the production of intermediate-mass elements.

3 METHODOLOGY



Frequency of C-O Shell Mergers :
C-O shell mergers occur in 85% of 3D-to-1D-guided CBM **(SH21)** and 95% of standard CBM models **(f0p02)**.

4 KEY FINDINGS

Odd-Z Production:

- Enhanced P, K, Cl, and Sc production in **3D-to-1D-guided CBM (SH21) with C-O shell mergers**.
- Up to 10× higher than in standard CBM (f0p02) with C-O shell mergers.

Role of Peak Temperature:
Peak temperature during shell mergers influences the production of elements around neon and magnesium.