Time Creates the Elements: Stellar Nucleosynthesis as Tau

Hydrogen to Iron via Tau-Register Escalation in Stellar Cores

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Stellar nucleosynthesis — the creation of elements from hydrogen in stellar cores — is, in the FOT, the tau-field progressively escalating through register levels. Hydrogen (Z=1) is the ground-state tau-element; helium (Z=2) is the first {2}-register product; carbon (Z=6=2x3) is the {2,3} junction; iron (Z=26=2x13) is the terminal fusion product because it sits at the boundary of the tau-field's {2}-branch energy gradient. Beyond iron, fusion requires tau-register input — only supernovae can cross it.

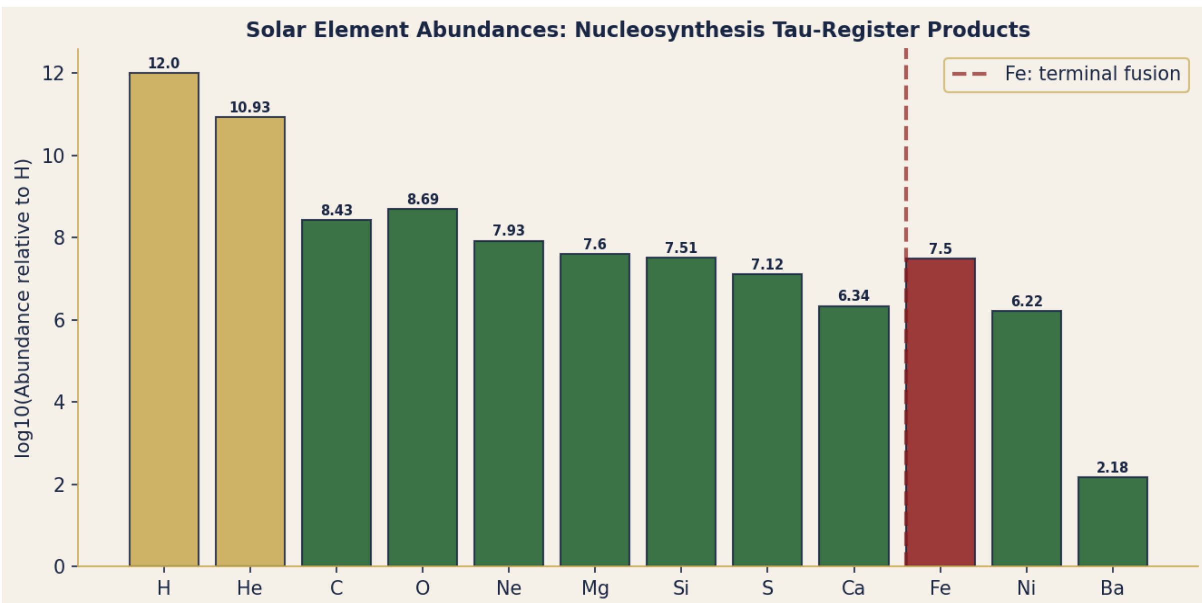

Figure 1. Solar element abundances. Gold = H/He (primary tau); red = Fe (terminal); green = even-Z (alpha-process). Values are log10 relative to H=12.

1. Hydrogen to Helium (P-TCE-1)

P-TCE-1 — H -> He: The {1} to {2} Register Transition

Hydrogen Z=1 is the tau ground state. Helium Z=2 = {2}: first {2}-branch element. pp-chain: 4 x ^1H -> ^4He + 2e+ + 2nu + 26.731 MeV. 26.731 MeV = tau-register elevation energy from Z=1 to Z=2. Solar core T = 1.5 x 10^7 K = 3 x 5 x 10^6 K (pure {3,5} x 10^6). The pp-chain runs at a {3,5} lattice temperature node — not a coincidence.

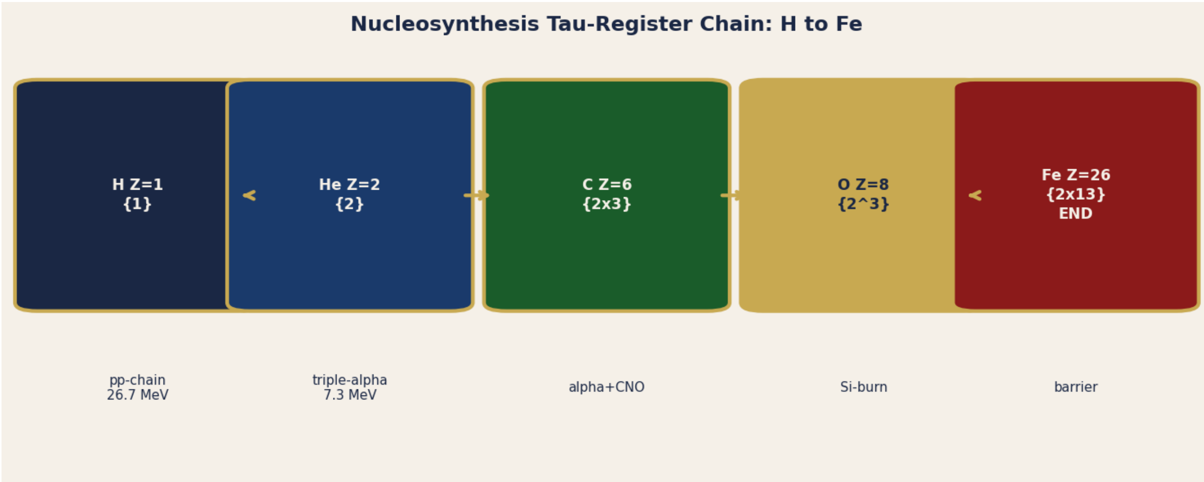

Figure 2. Nucleosynthesis tau-register chain from H (Z=1) to Fe (Z=26). Each is a {2,3,5} lattice product. Iron ends the energy-releasing fusion chain.

2. Iron Boundary and Carbon Junction (P-TCE-2 and P-TCE-3)

P-TCE-2 — Iron Z=26: Tau-Register Binding Energy Maximum

Nuclear binding energy per nucleon peaks at Fe-56 (8.7906 MeV/nucleon). Below Z=26: fusion releases tau-register energy (exothermic). Above Z=26: fusion requires tau-register input (endothermic). FOT: Z=26 = 2 x 13. 13 is the first prime outside the {2,3,5} lattice. The iron boundary marks where {2,3,5} lattice binding runs out. Only the supernova tau-pulse (10^44 J in ~10 s) crosses the iron barrier.

P-TCE-3 — Carbon Z=6 = 2x3: The {2,3} Junction Element

Carbon Z=6 = 2 x 3 occupies the {2} and {3} prime branch junction. This gives carbon unique chemical versatility: {2}-branch: double bonds (sp2), graphene, benzene; {3}-branch: triple bonds (sp). Carbon is the only element with Z = 2 x p where p is also prime (except Z=10=2x5, Z=14=2x7). Only at Z=6: both factors (2 and 3) are prime — the unique {2,3} junction. Carbon's versatility is its register address: exactly at the {2,3} lattice intersection.

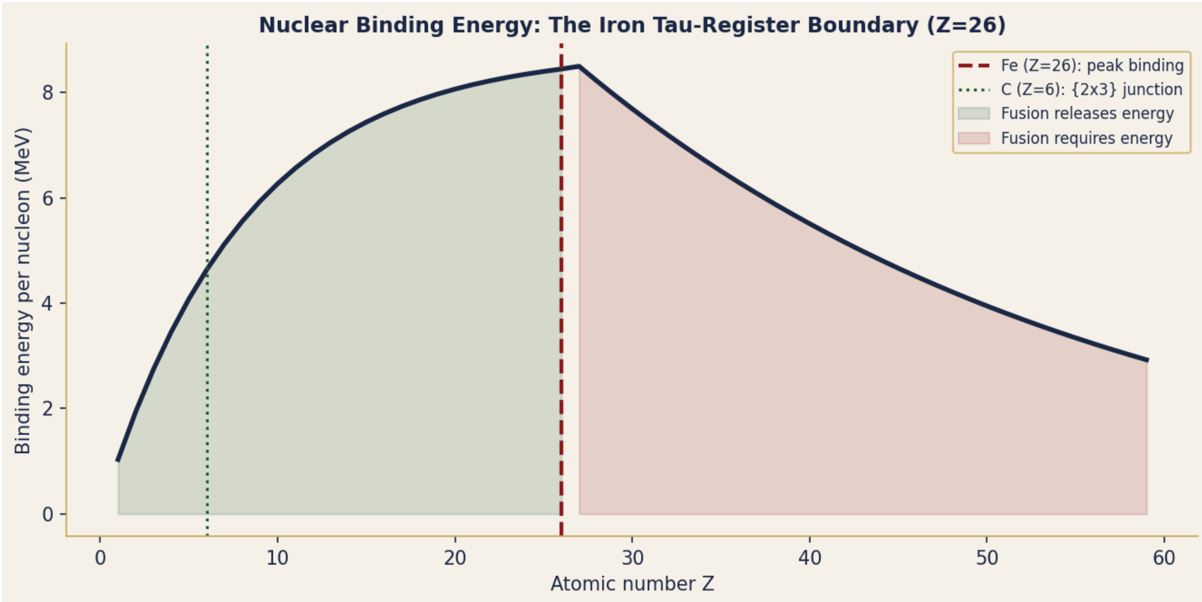

Figure 3. Binding energy per nucleon vs Z. Green: fusion releases energy (Z<=26). Red: fusion requires energy (Z>26). Peak at Fe (Z=26). C junction at Z=6.

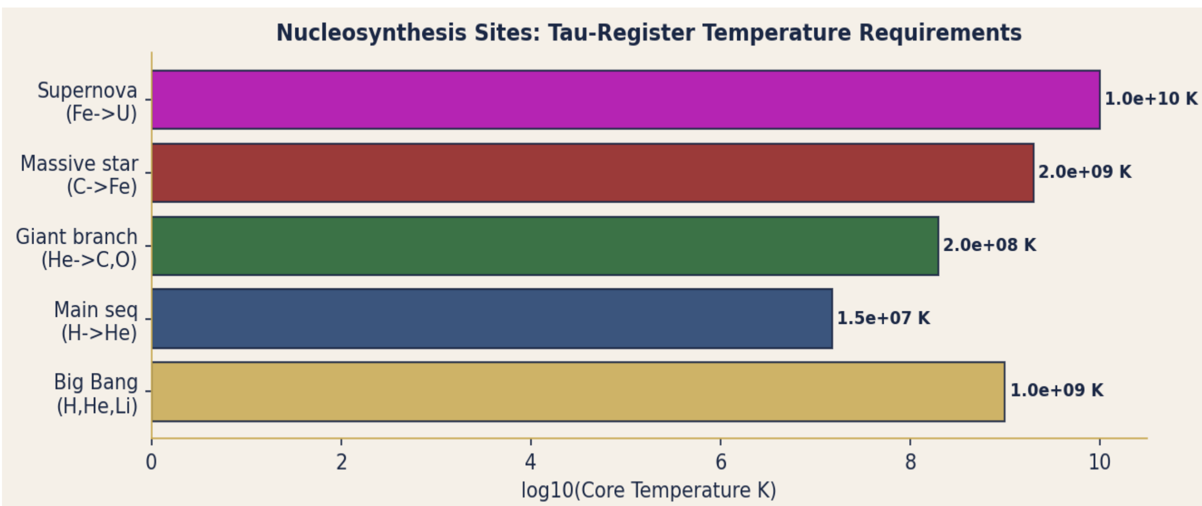

Figure 4. Core temperatures required per nucleosynthesis site. Each site = a higher tau-register level. Supernova (10^10 K) crosses the iron barrier.
