

Stellar Evolution in I Zw 18

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Norbert Langer
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VFTS FLAMES Workshop

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Please meet I Zw 18!



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I Zwicky 18

- Blue Compact Dwarf Galaxy
- 18 Mpc \rightarrow local
- SFR: $1 M_{\odot}/\text{yr}$
- ionized gas
- low metallicity!
- unevolved gal.



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$$12 + \log(\text{O}/\text{H}) = 7.17$$

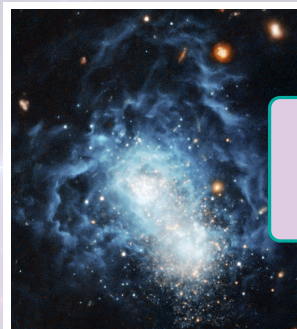
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$$Z = 1/50 Z_{\odot} \approx 0.0002$$

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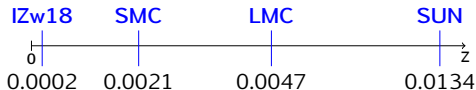
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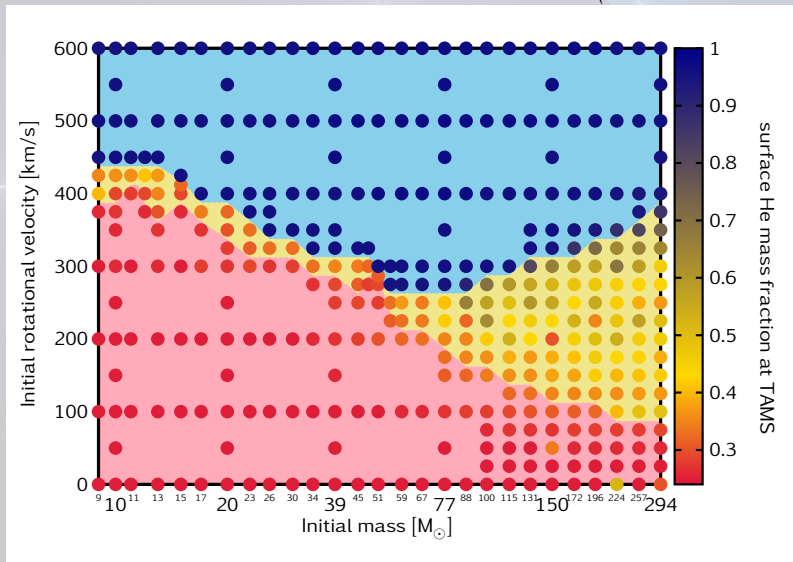
\downarrow

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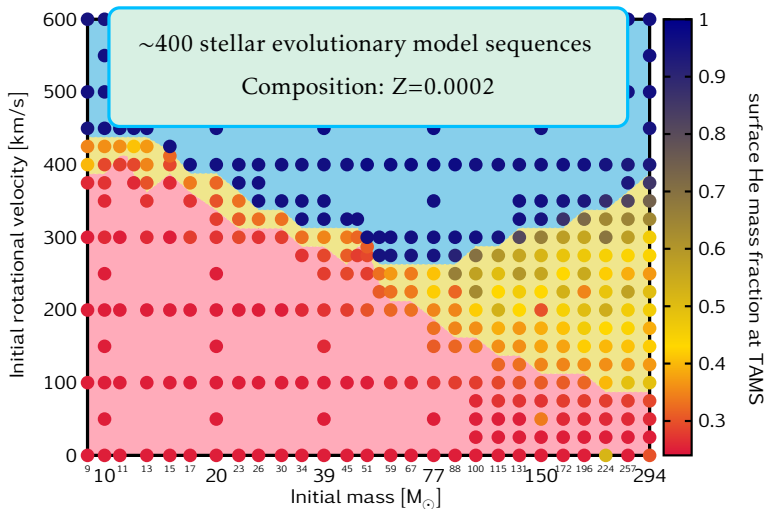
The grid of single stellar models with $Z=0.0002$

Szécsi et al. 2015 (submitted to A&A)



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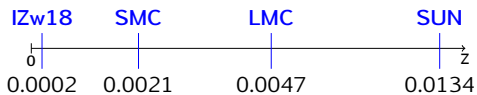
Why I Zw 18?



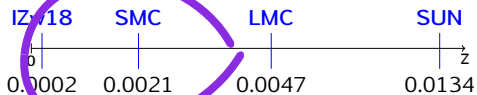
Why I Zw 18? Why $Z=0.0002$?



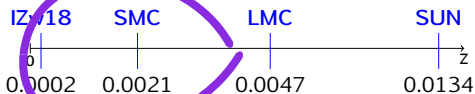
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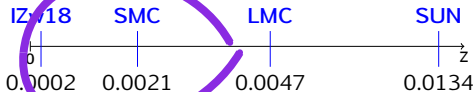


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- SLSNe
- broad line type Ic SNe

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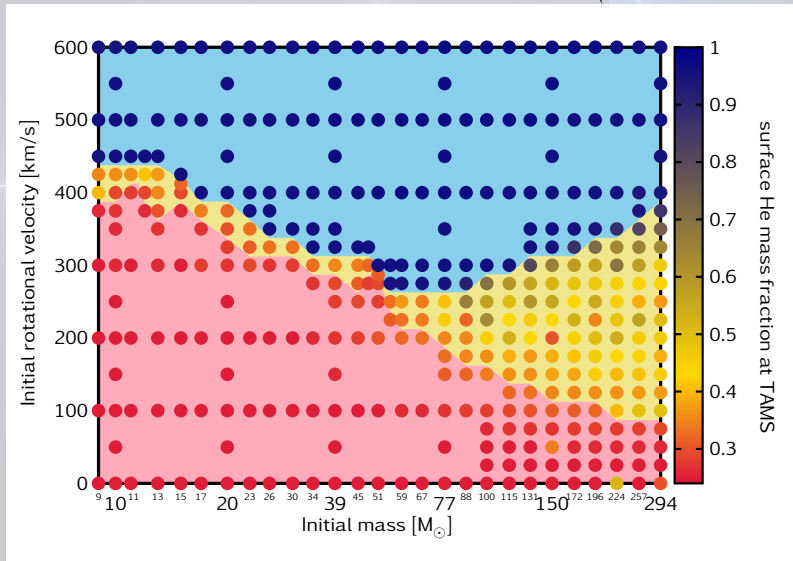


- IGRB
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- high redshift galaxies
- second generation of stars
- Globular Clusters...

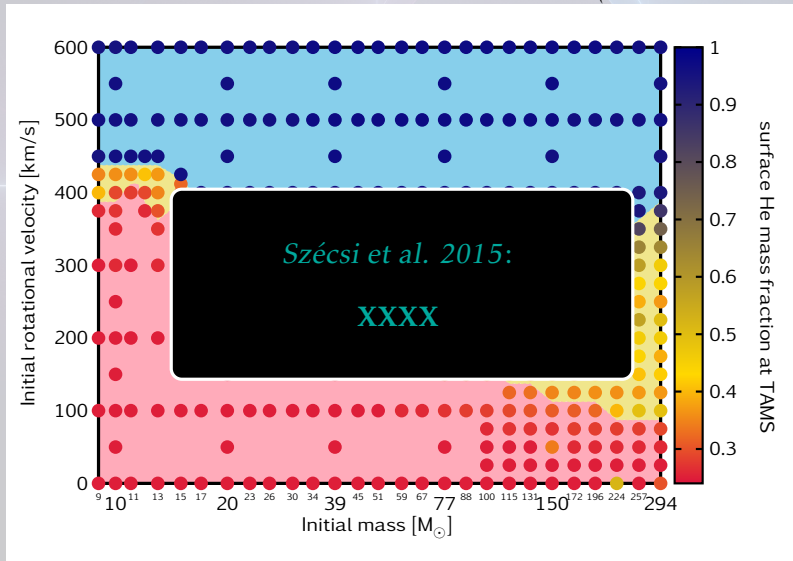
The grid of single stellar models with $Z=0.0002$

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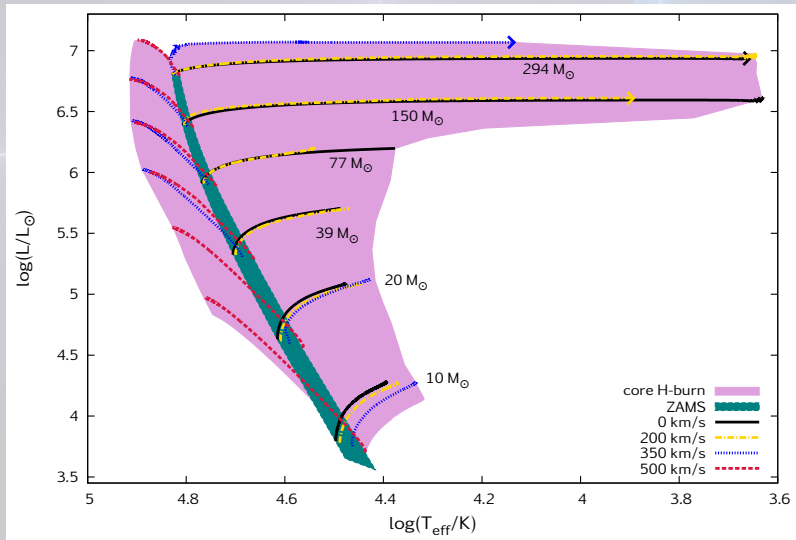


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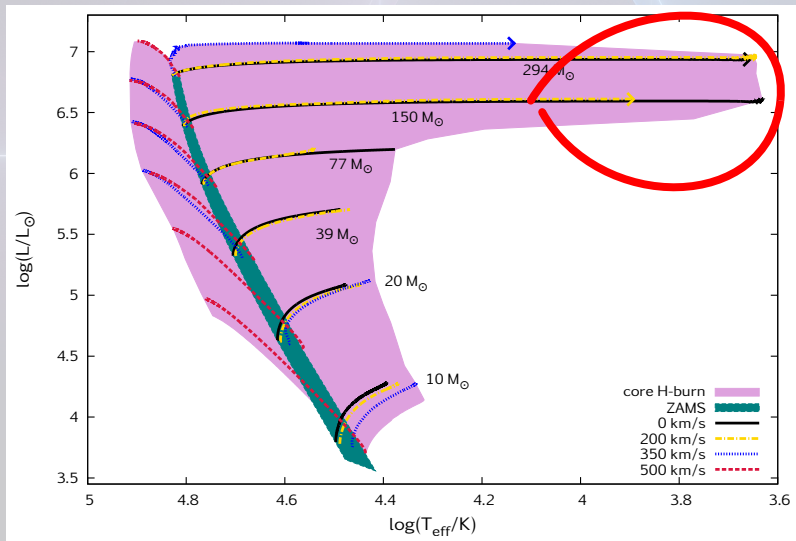
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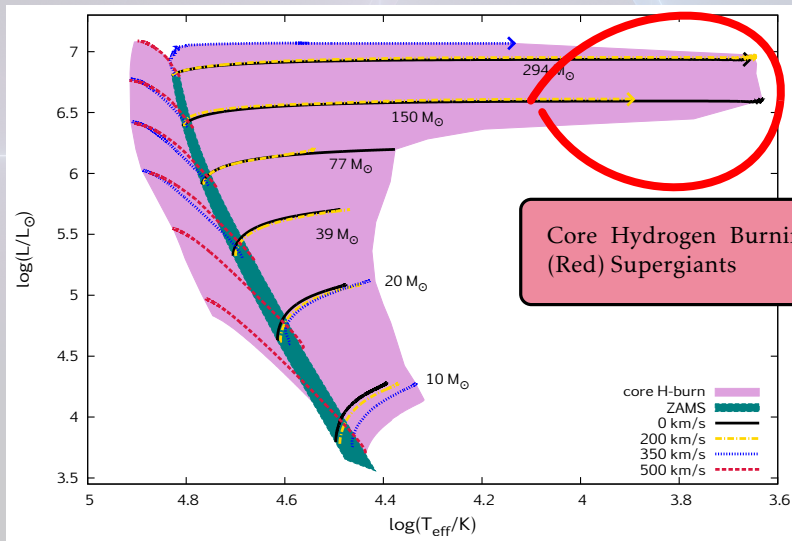
Hertzprung–Russell diagram



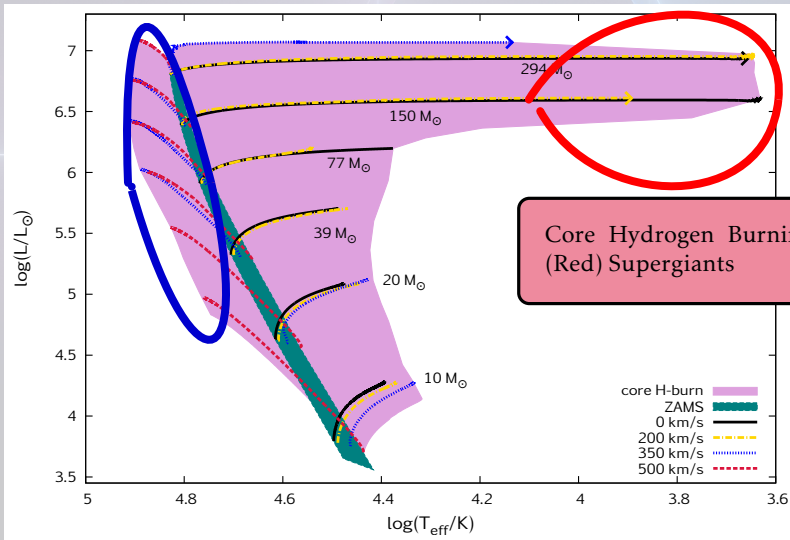
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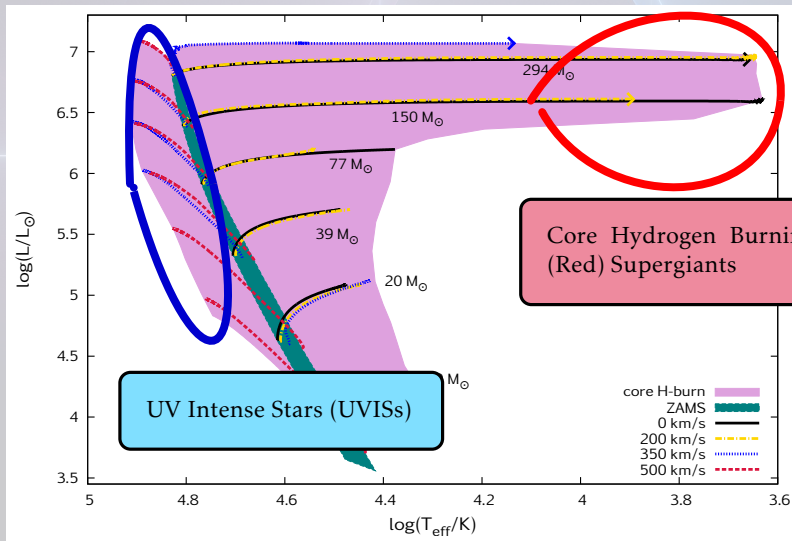
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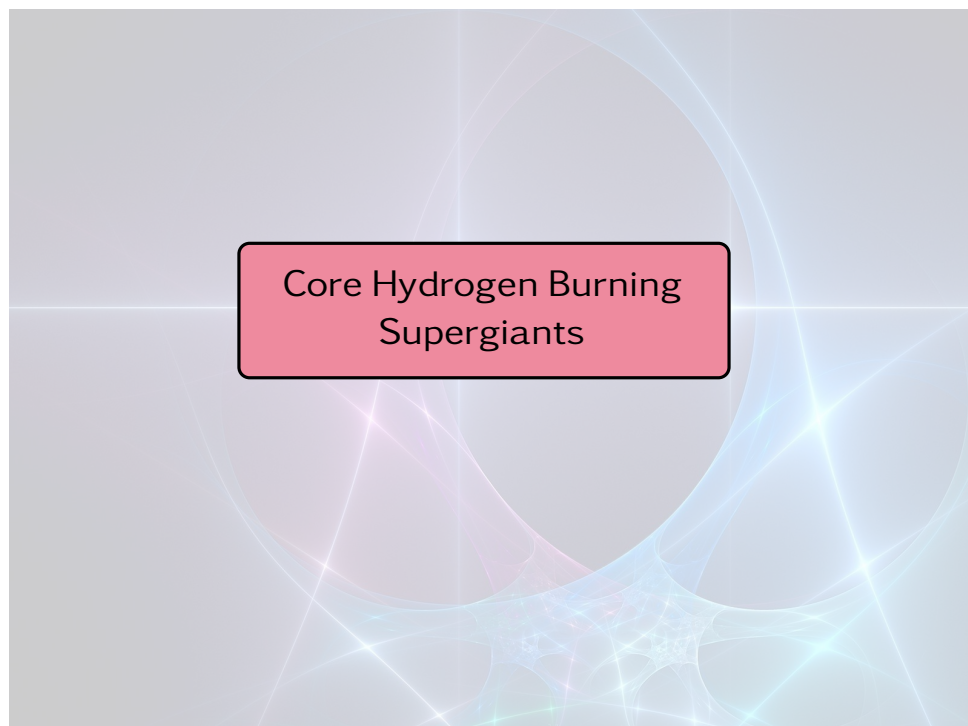


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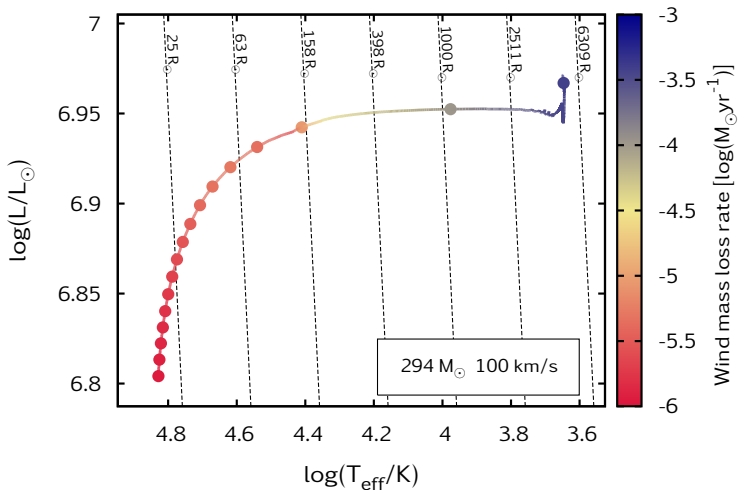
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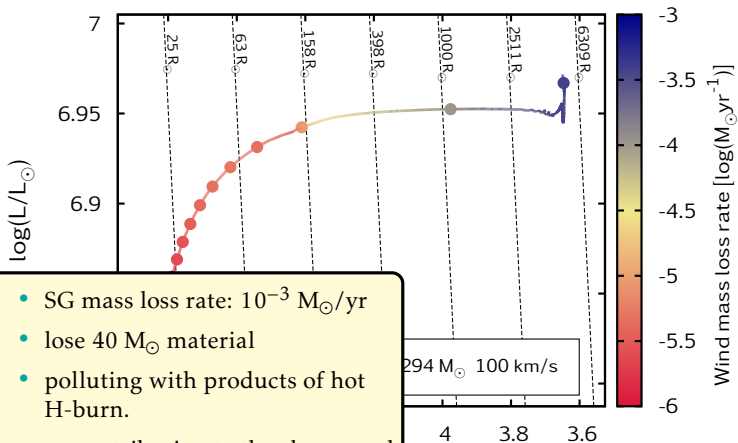


Core Hydrogen Burning
Supergiants

Core Hydrogen Burning Supergiants

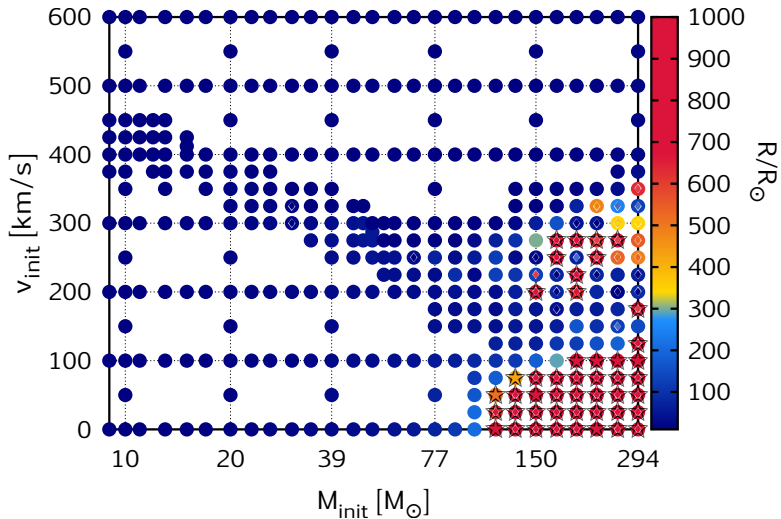


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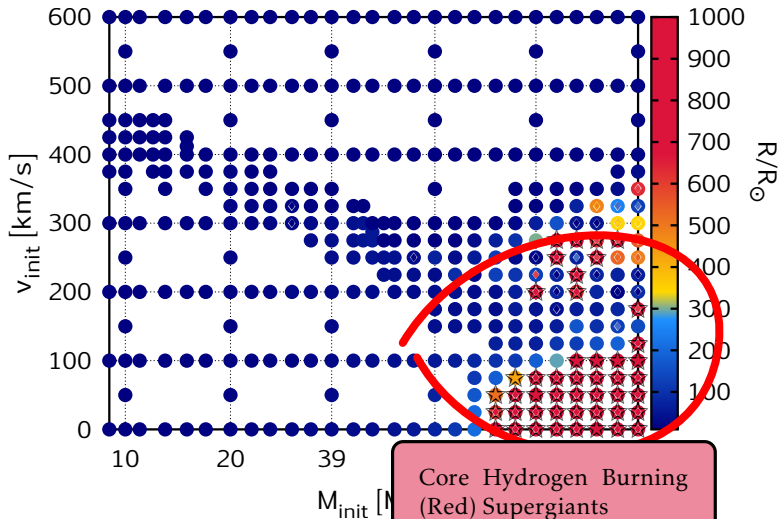


- SG mass loss rate: $10^{-3} M_{\odot}/\text{yr}$
- lose $40 M_{\odot}$ material
- polluting with products of hot H-burn.
- → contribution to the chem. evol of environment
- Globular Clusters...

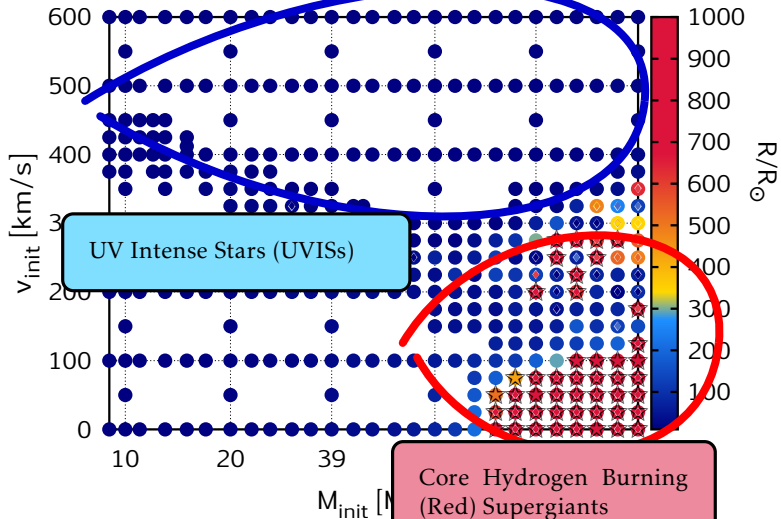
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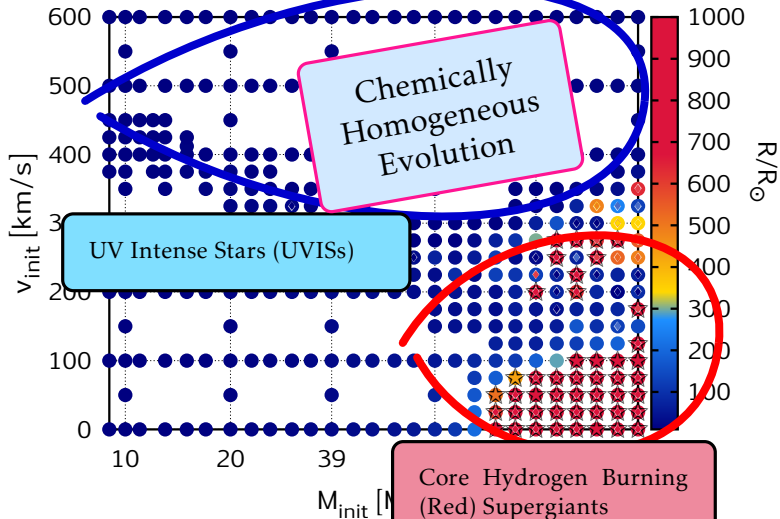
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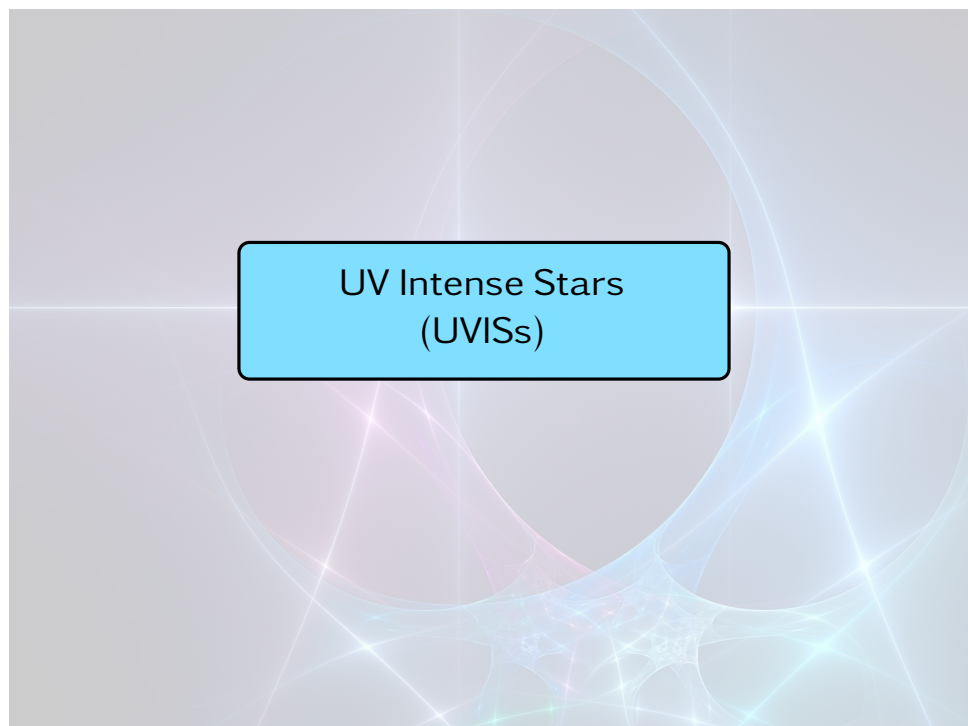


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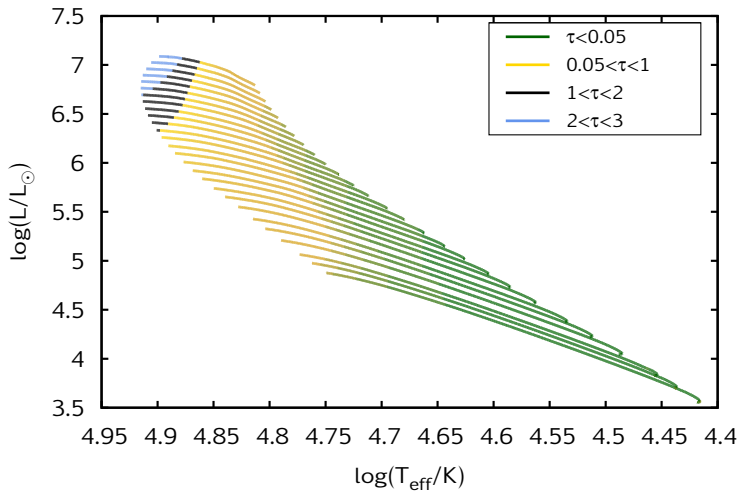
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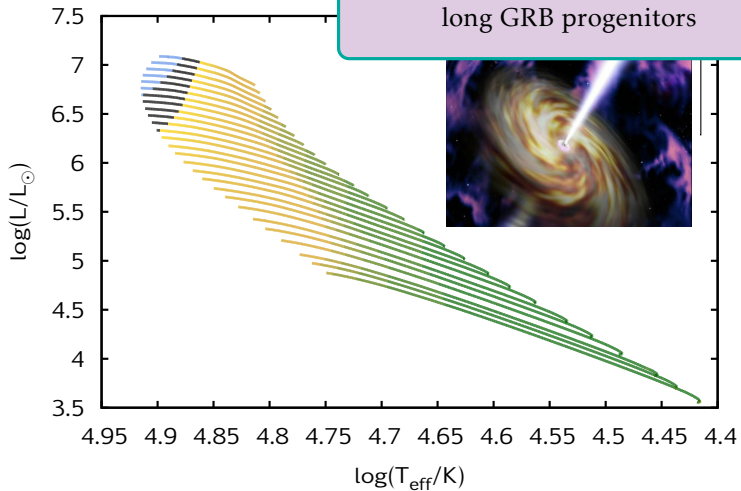
The background features a large, faint, light-colored circle centered on the page. Overlaid on this are several glowing, ethereal lines in shades of blue, purple, and pink. These lines form a complex, web-like pattern that resembles a network or a stylized constellation. The overall aesthetic is futuristic and scientific.

UV Intense Stars
(UVISs)

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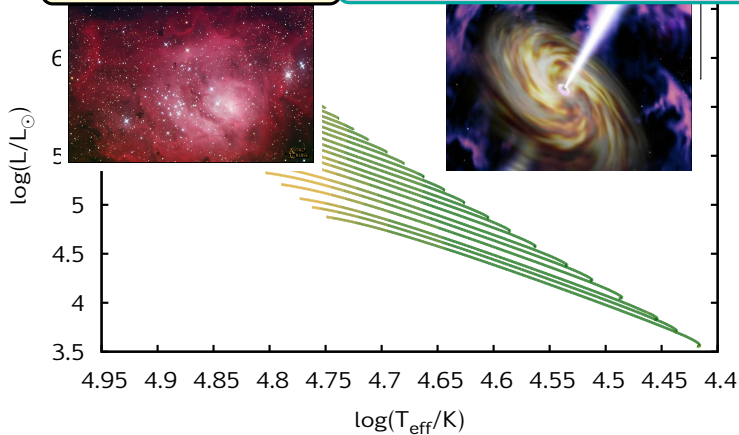
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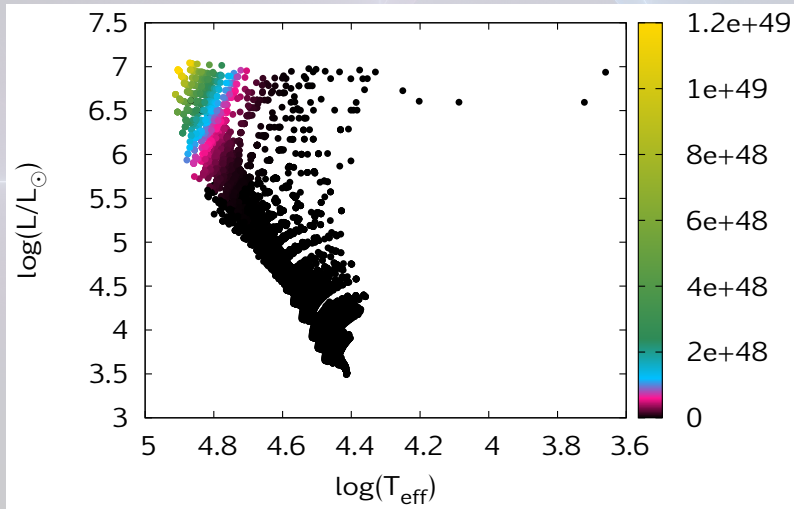
UV Intense Stars (UVISs)

photoionization!

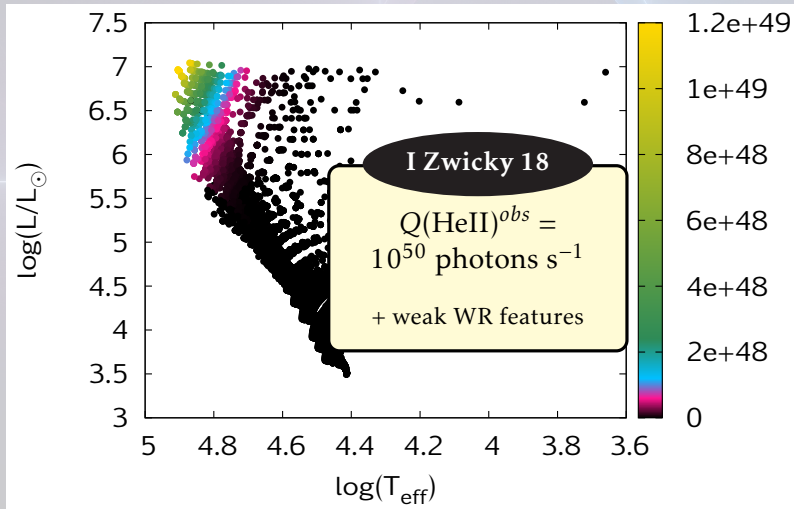
long GRB progenitors



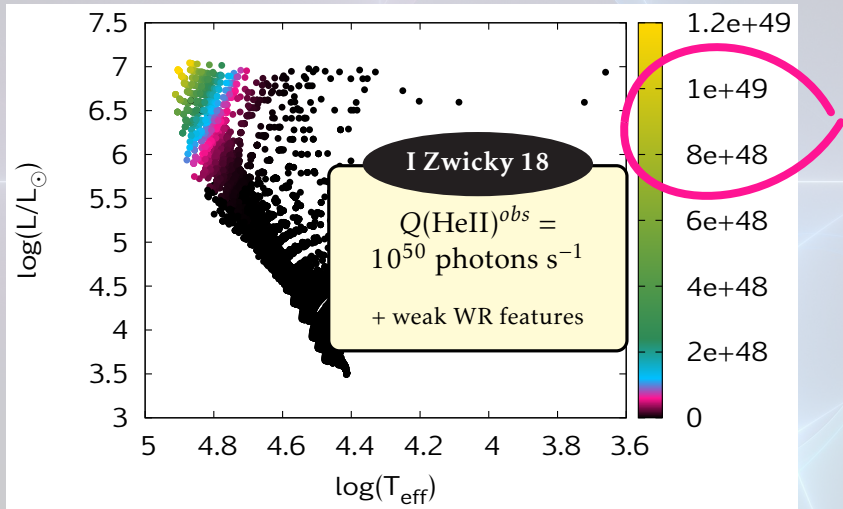
Photoionization – Hell continuum



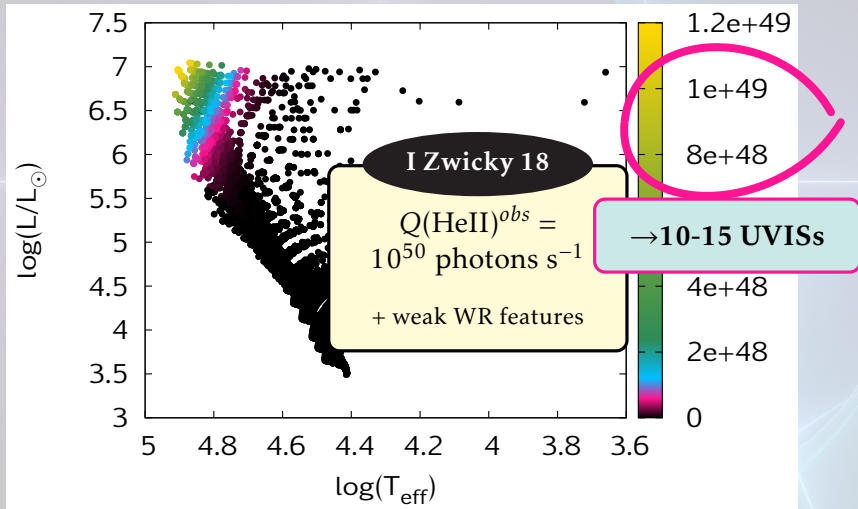
Photoionization – HeII continuum



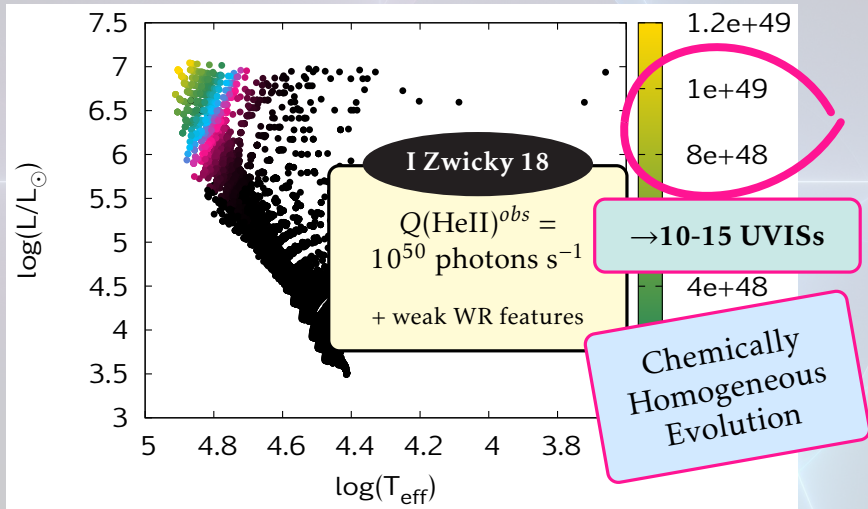
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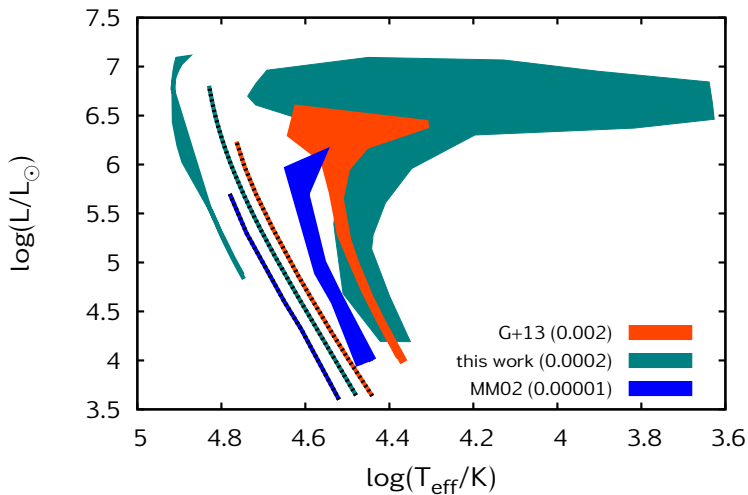
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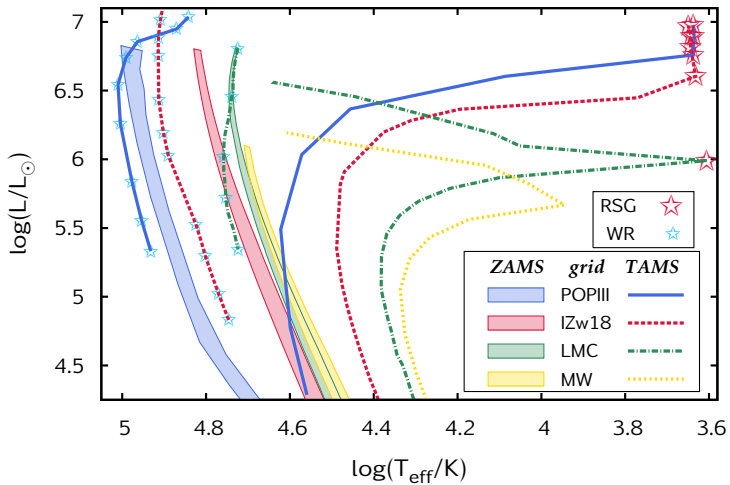
Photoionization – HeII continuum



Comparison to the Geneva grids at low-Z



Comparison to Bonn grids ($0 < Z < Z_{\odot}$)



Summary

- Grid of 400 stellar sequences
- Composition: $Z=0.0002 \rightarrow \text{I Zw 18}$

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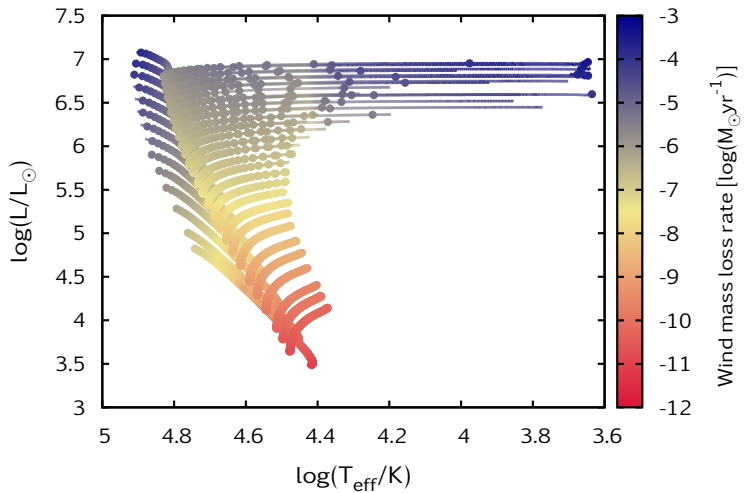
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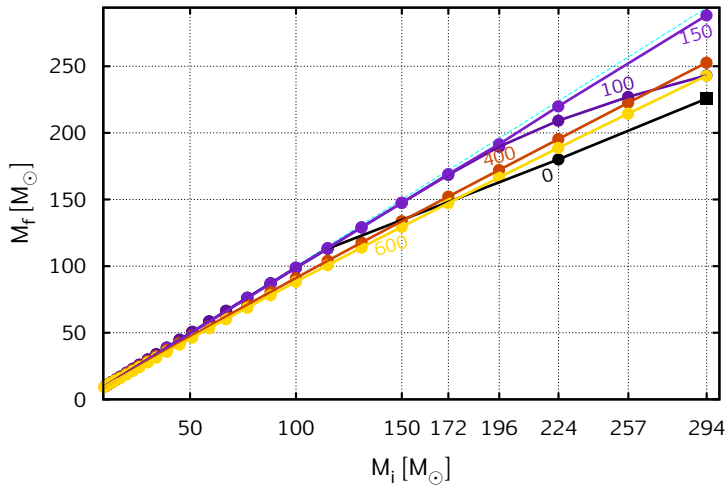


Thank you
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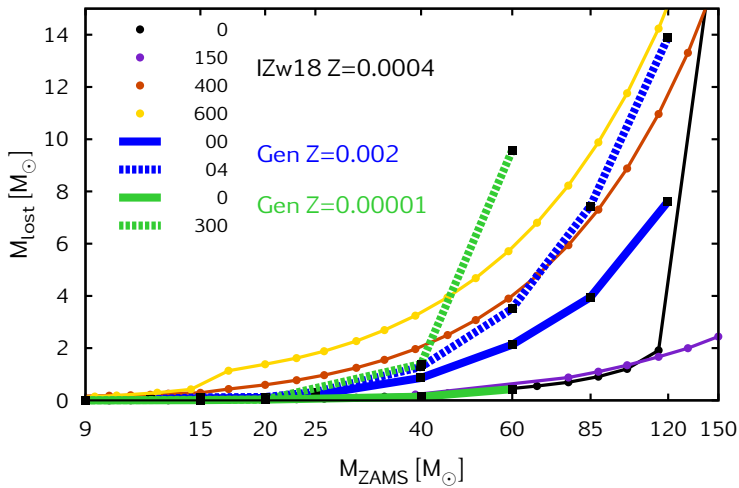
Appendix: Mass loss



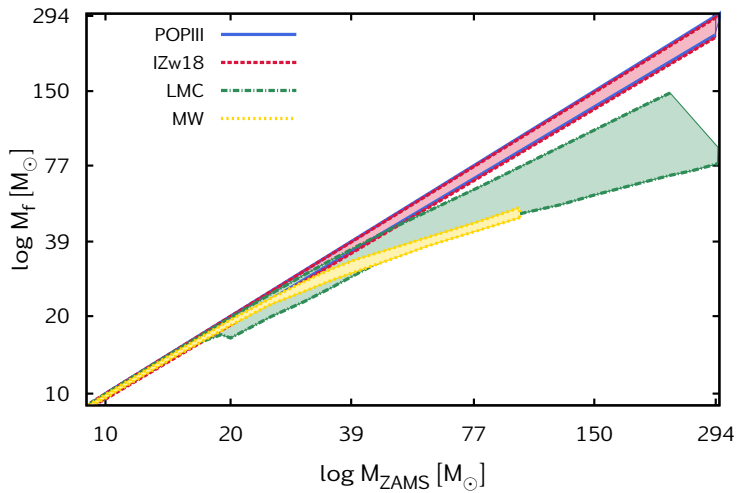
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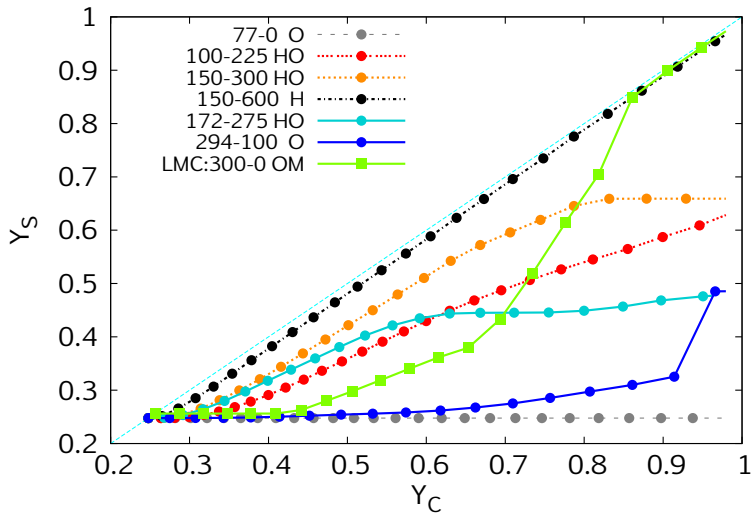
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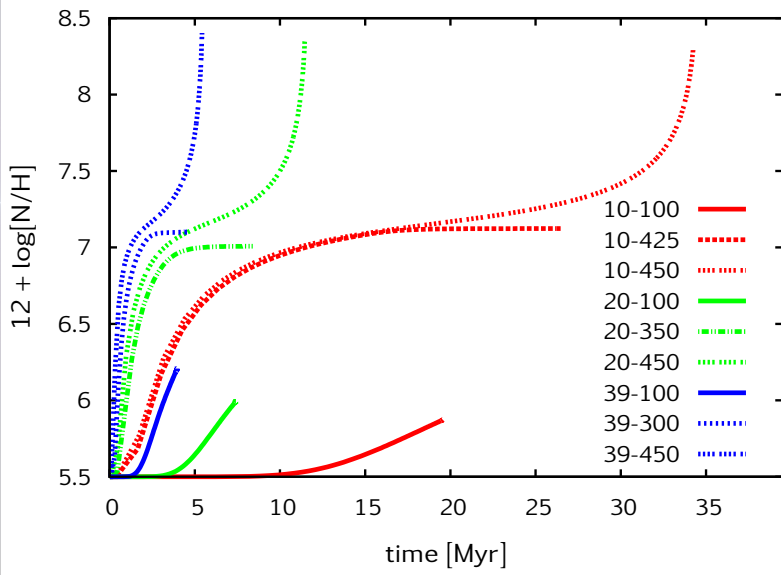
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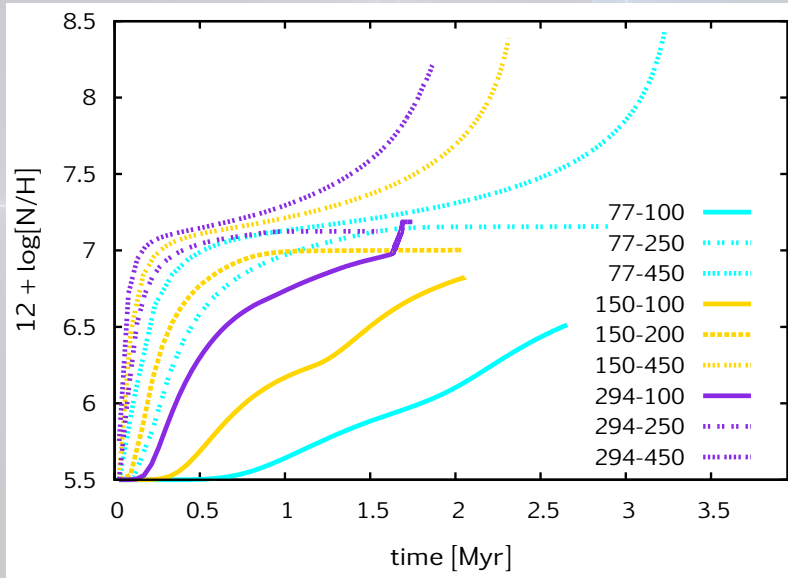
Appendix: Surface Helium



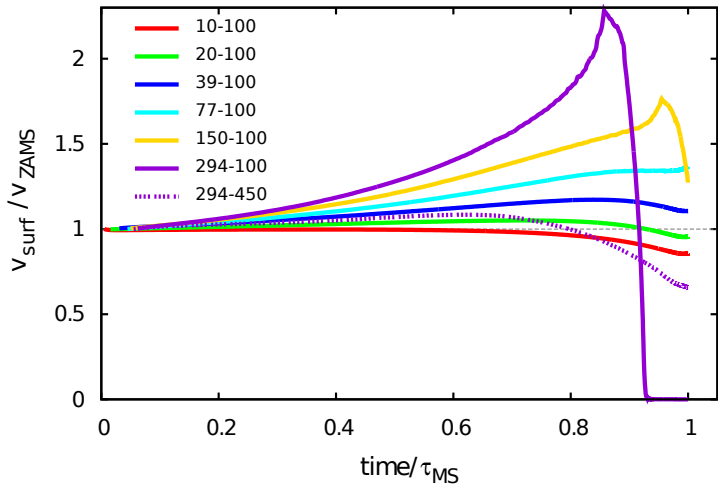
Appendix: Surface Nitrogen



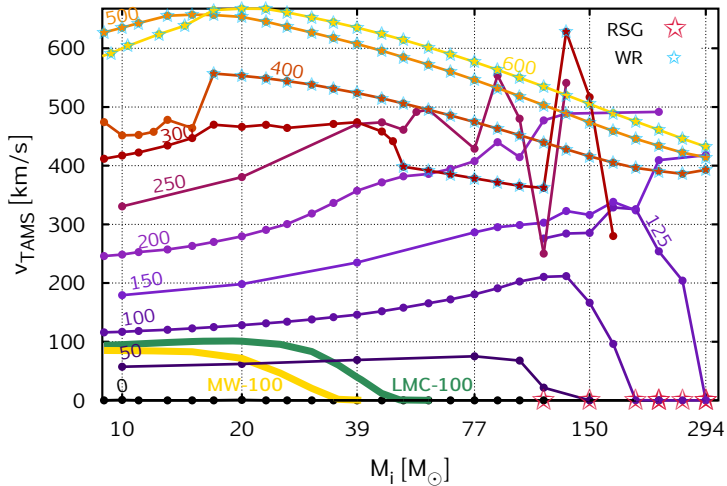
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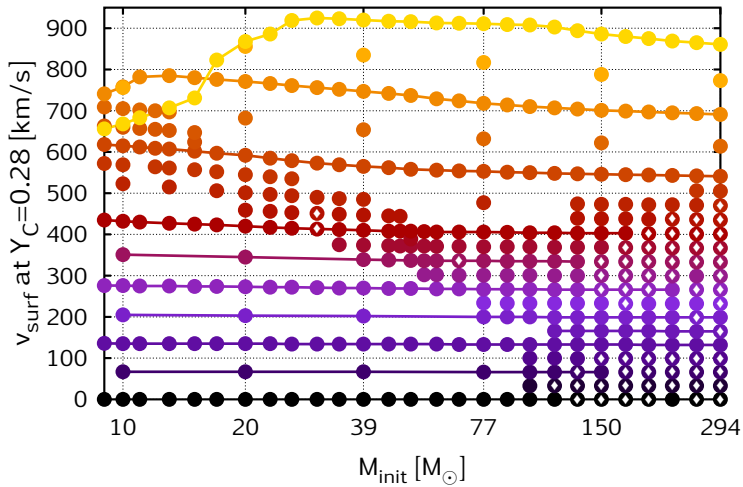
Rotation



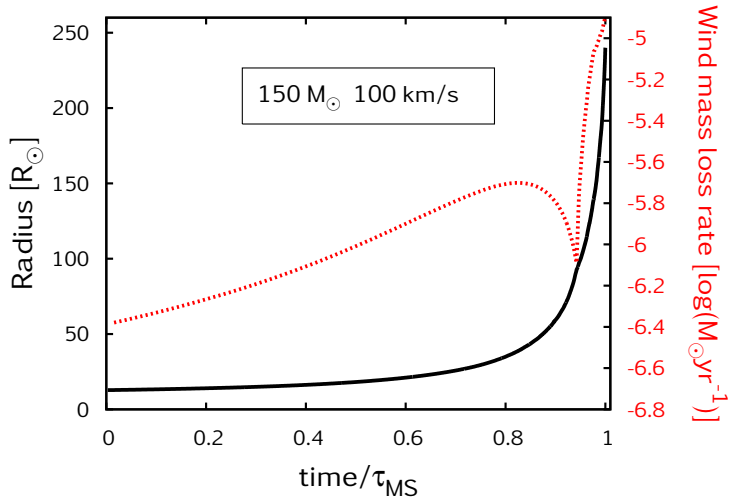
Appendix: Rotation



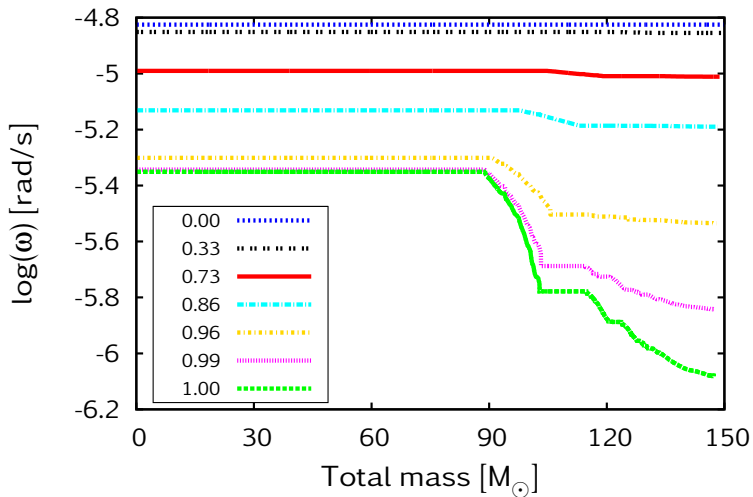
Appendix: Rotation



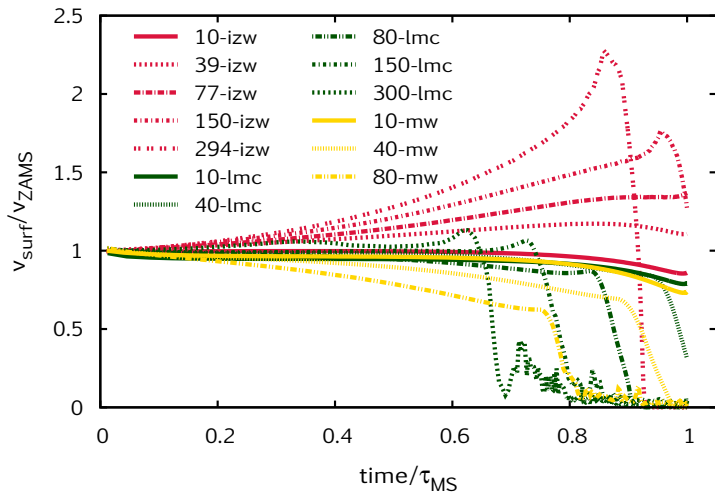
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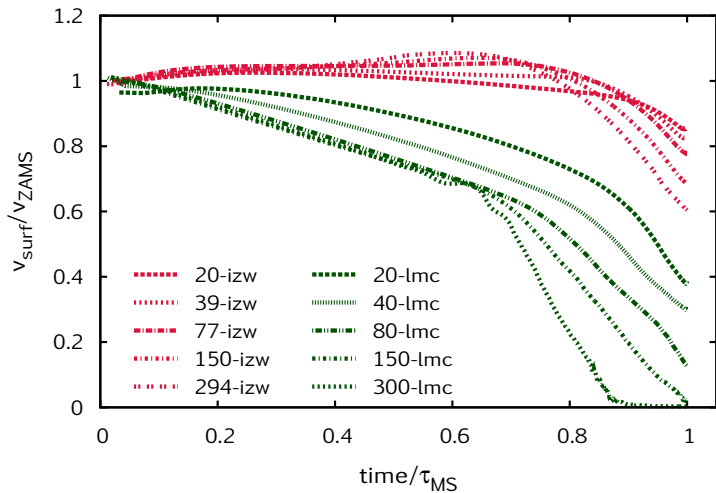
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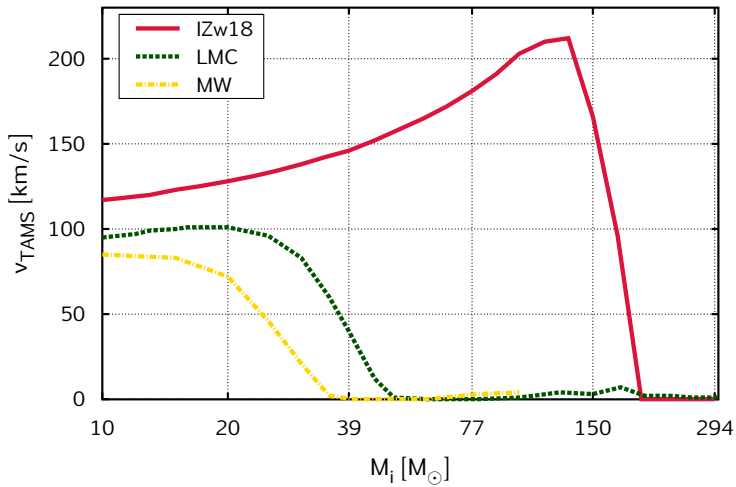
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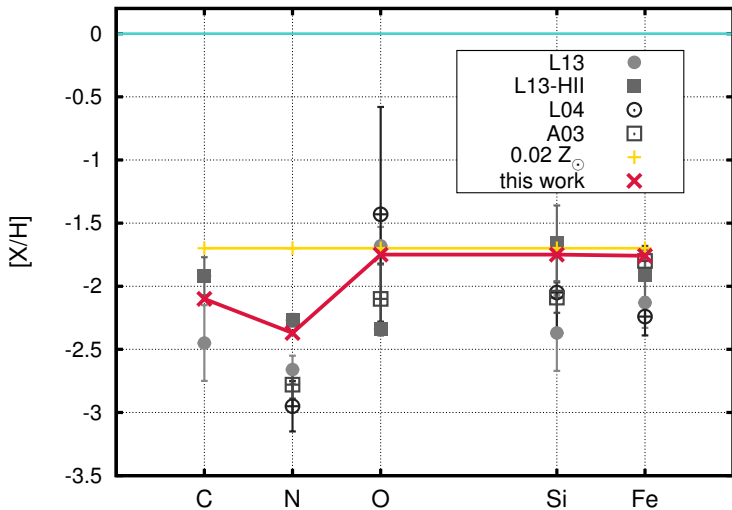
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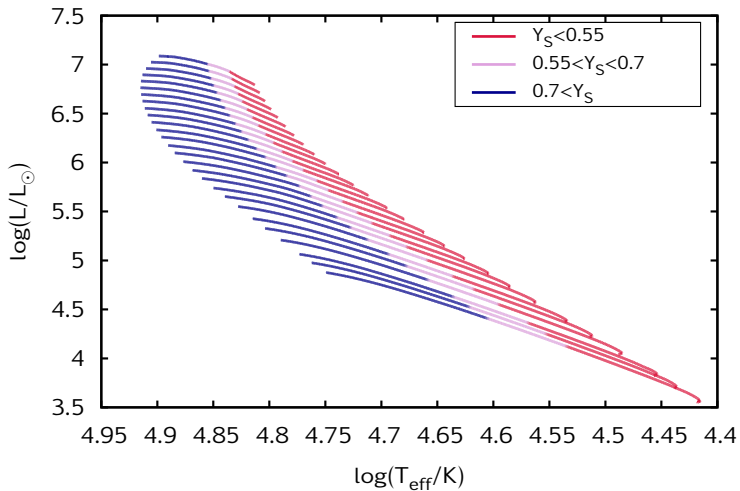
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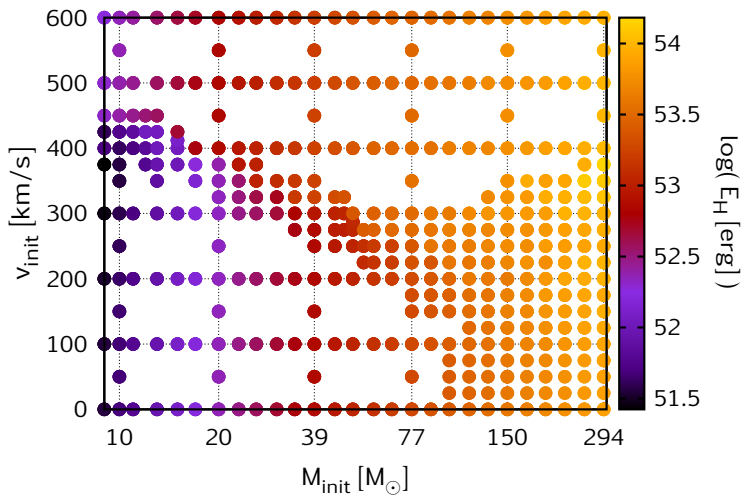
Appendix: Initial Composition



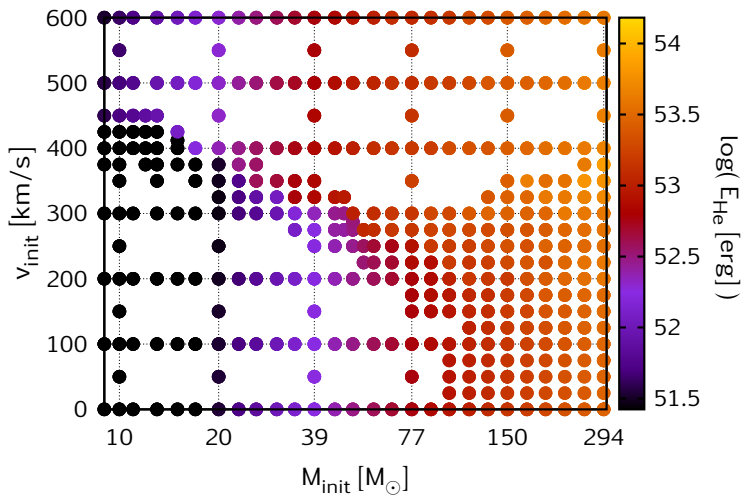
Appendix: Photoionization



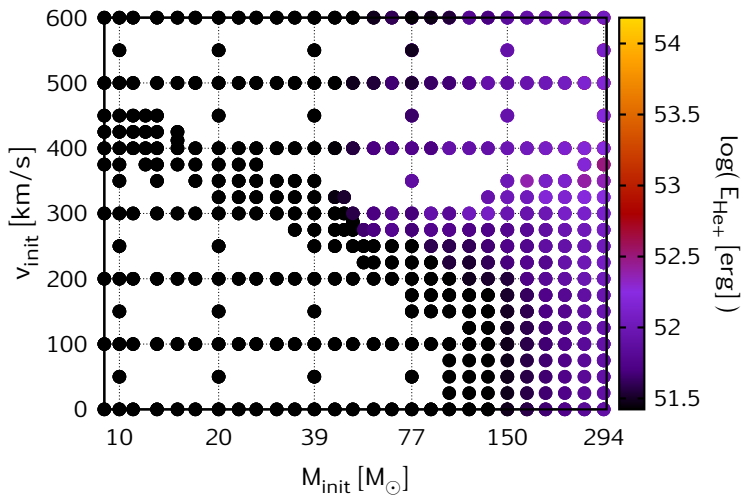
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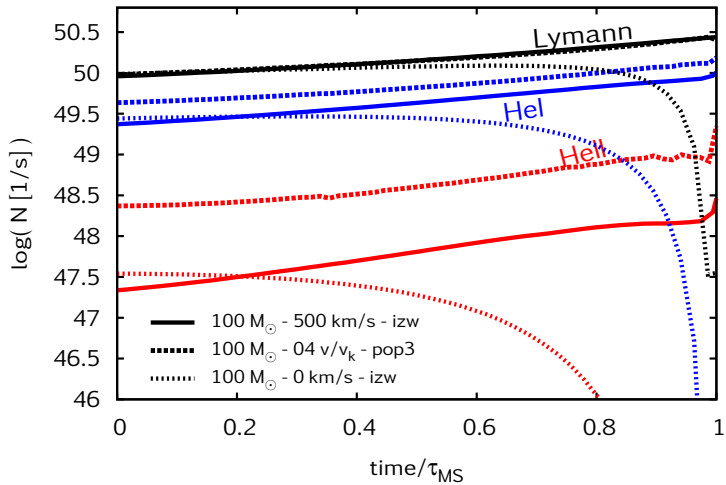
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