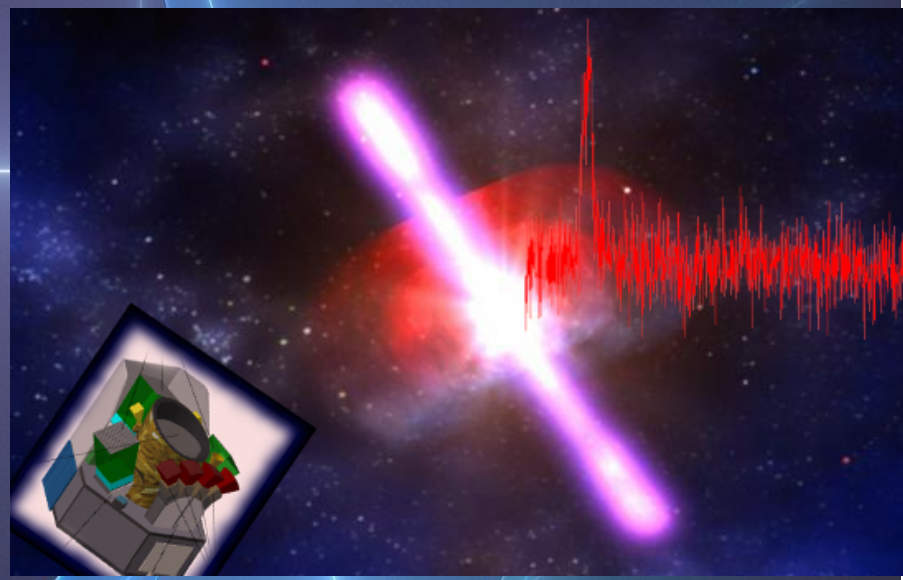
Life and death of metal-poor massive stars – A new vision for THESEUS' science

Dorottya Szécsi

Humboldt Fellow
University of Cologne



Symposium S4, EWASS, Lyon
24th June 2019

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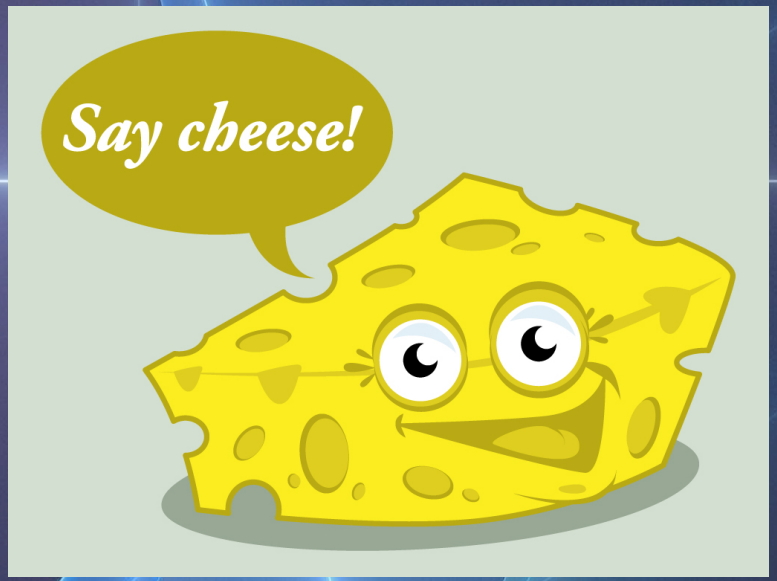

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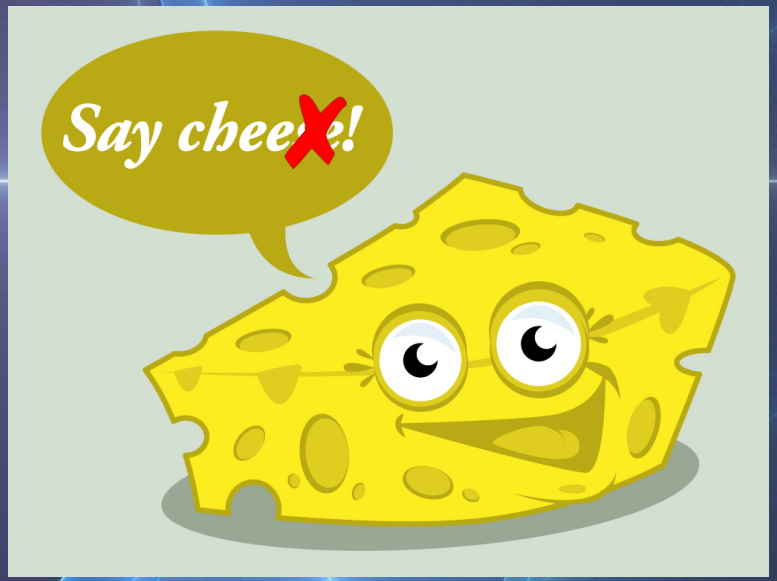

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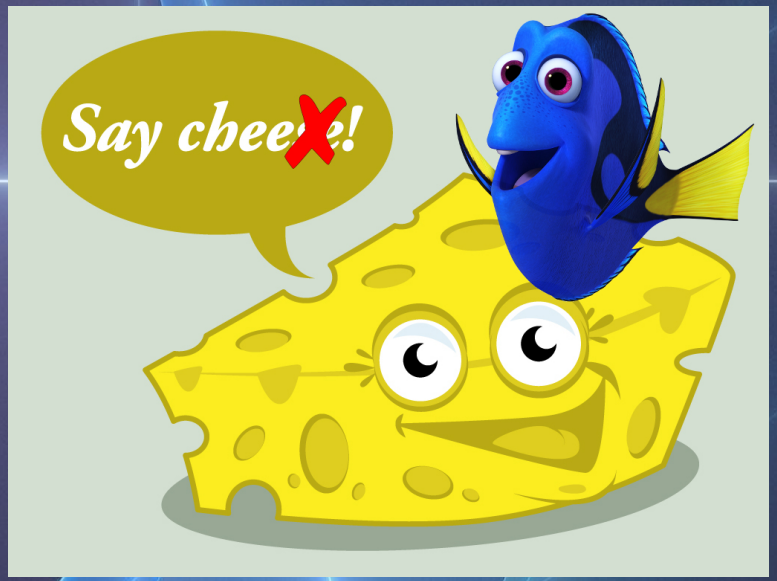

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GW/SGRB progenitors: 3 theories

e.g. Vigna-Gómez..**Szécsi**+18; **Szécsi**'17a,b; **Szécsi**&Wünsch'18

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Common envelope in a binary

Chemically-homogeneous evolution in a binary

Dynamics in dense clusters

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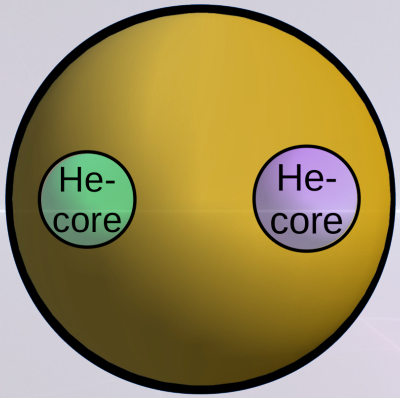

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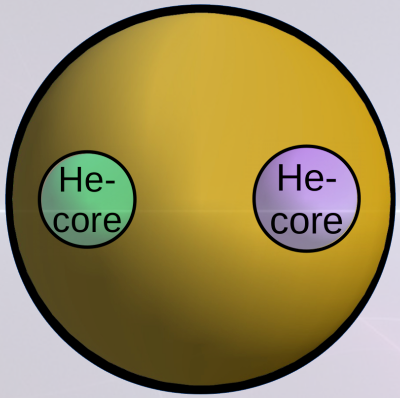

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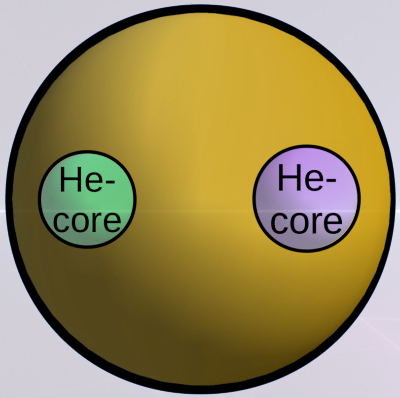

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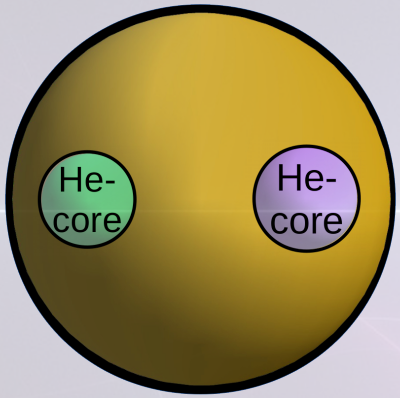

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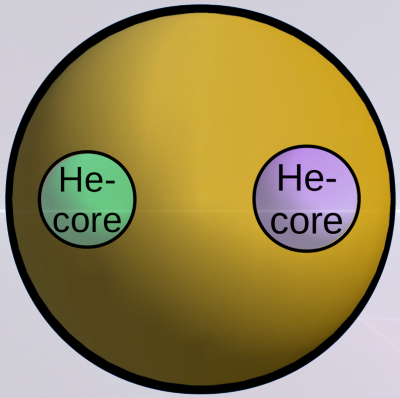

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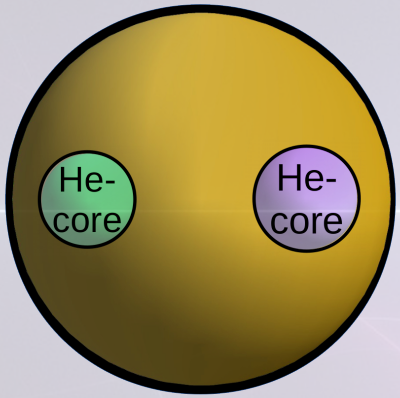

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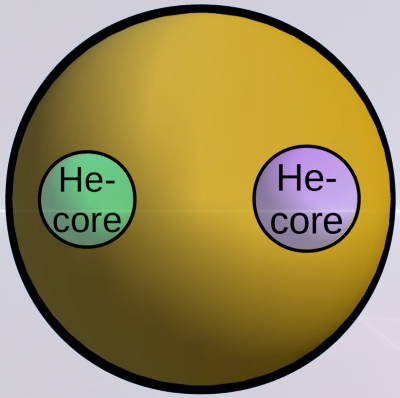

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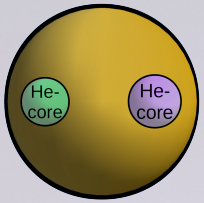

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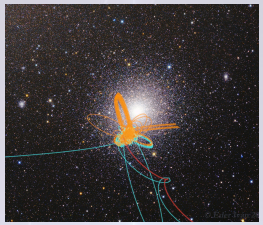

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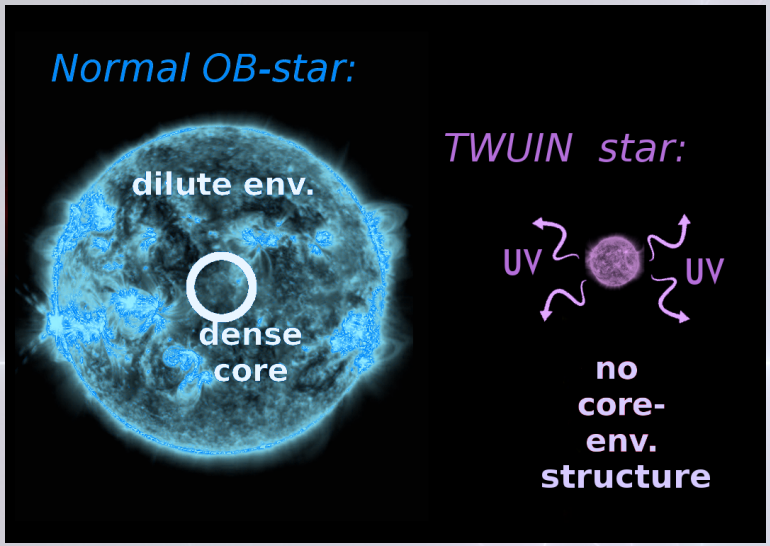

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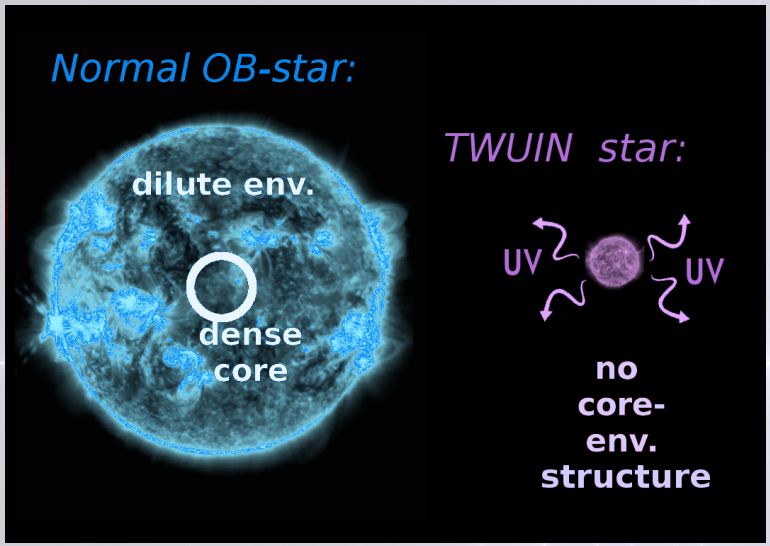

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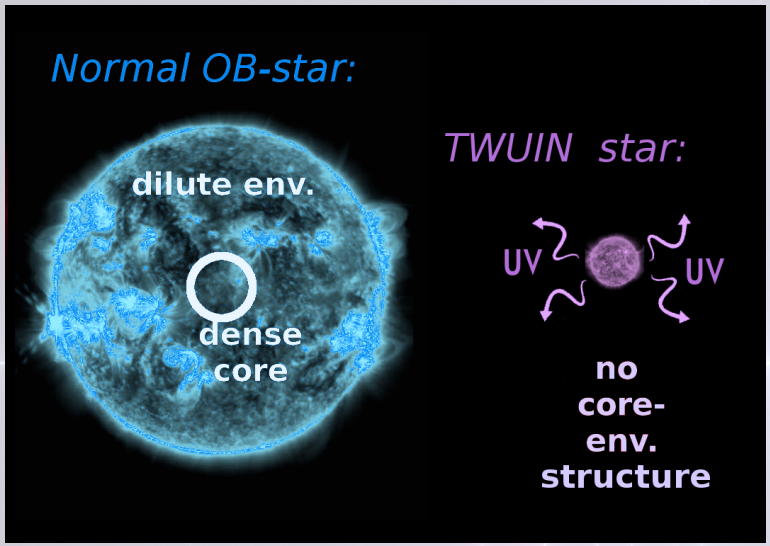

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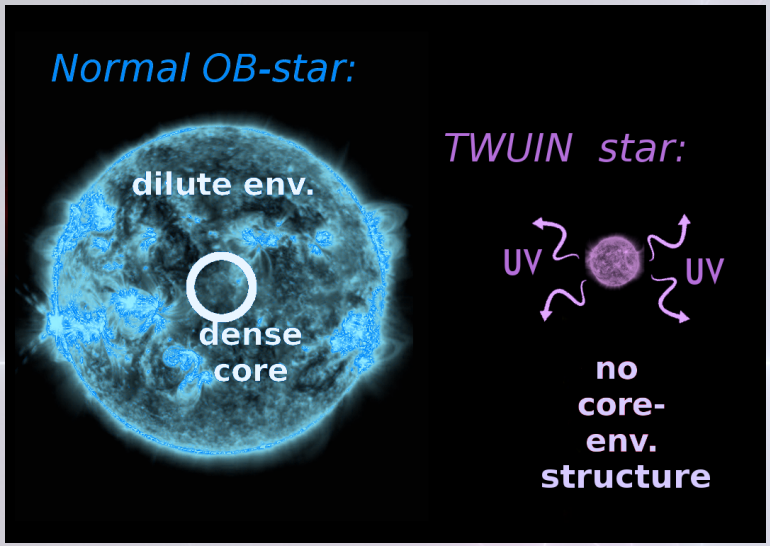

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GRB progenitors

Dorottya Szécsi:
New vision
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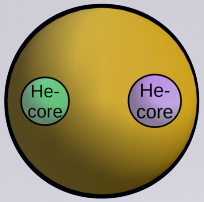

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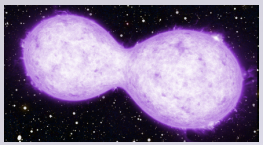

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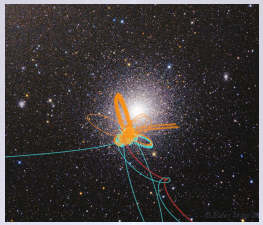
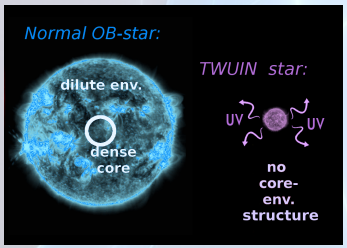


Dynamics in dense clusters

Metal-poor massive stars



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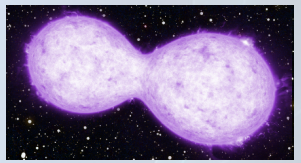

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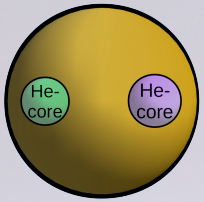

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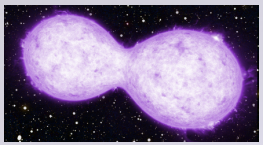

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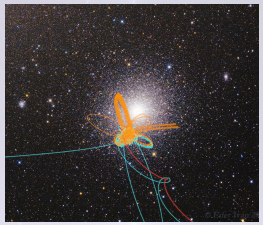
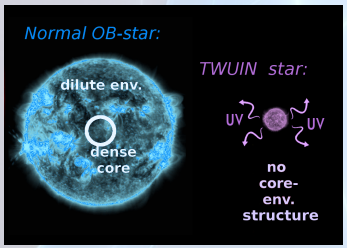


Dynamics in dense clusters

S-GRBs



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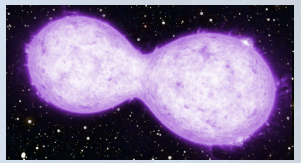

Chem.-hom. evolution in a **binary**

L-GRBs

However...

Are they observed?

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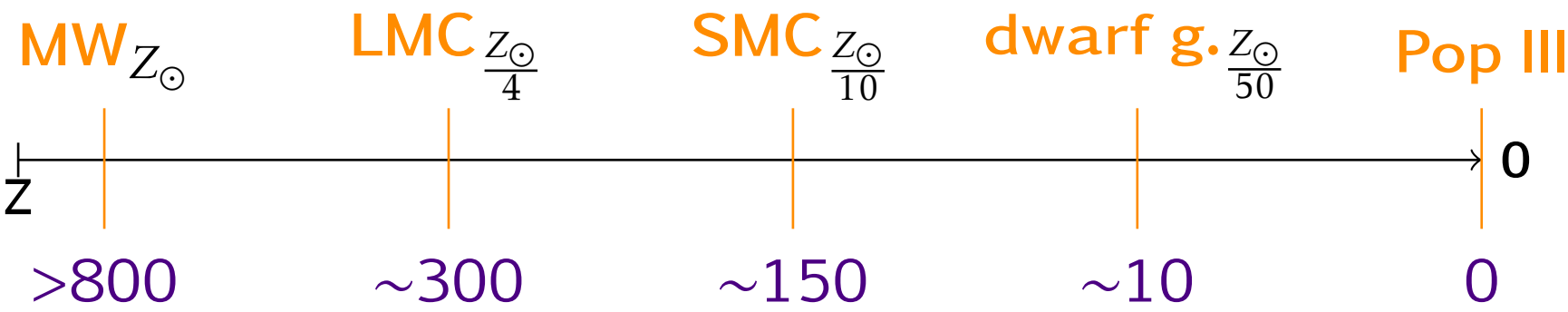

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(i.e. direct evidence)

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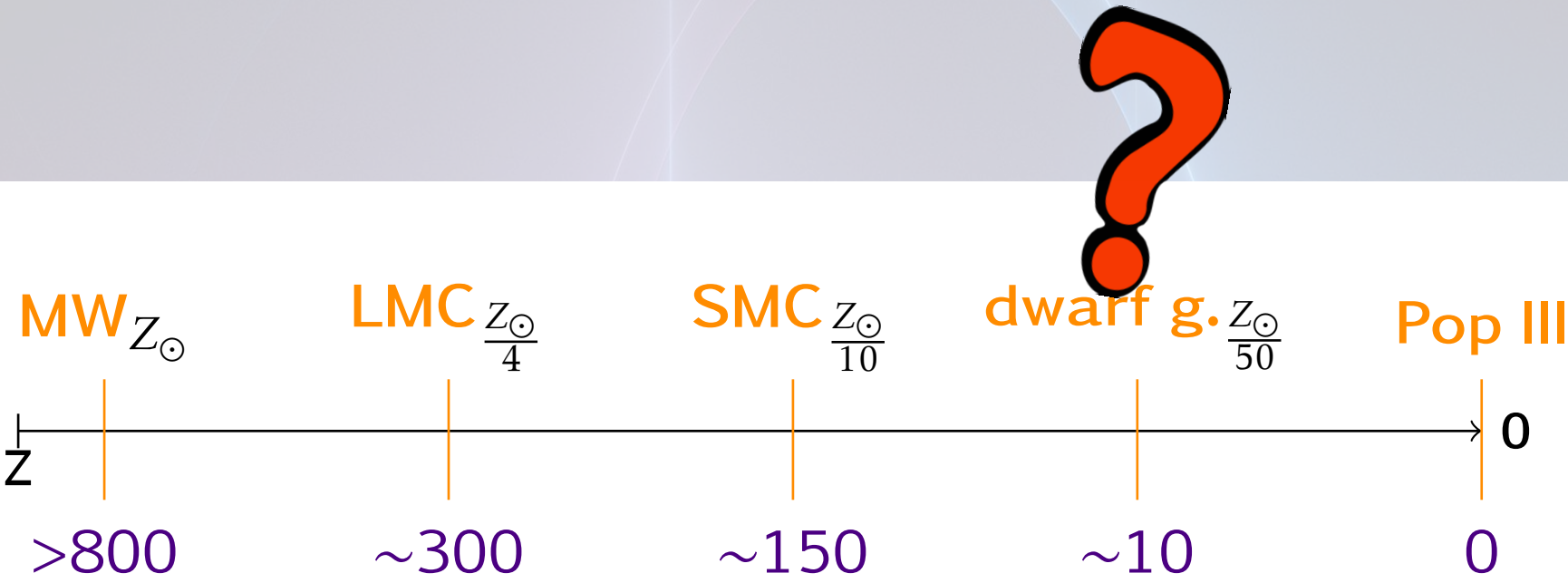

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Indirect evidence!

Dwarf galaxies

Legrand+07, Aloisi+09, Annibali+13, Kehrig+13, Lebouteiller+13

Dwarf galaxies

I Zwicky 18's ionization

- observed: $Q_{\mathrm{He\,II}} = 10^{50}\ \gamma/\mathrm{s}$
  Kehrig+2015
- explained by Chem. Hom. single stars
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- explained by Pop-III stars
  e.g. Heap+16
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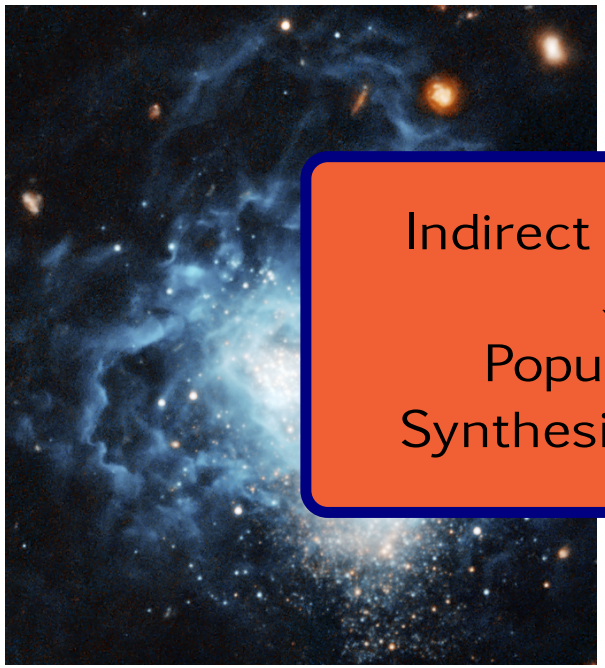

Indirect evidence
↓
Population
Synthesis studies

Legrand+07, Aloisi+09, Annibali+13, Kehrig+13, Lebouteiller+13

My Vision

Dorottya Szécsi:
New vision
for THESEUS

My Vision

- a **synergy** between GRBs & massive stars

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use GRBs to constrain theories of low-Z massive stars *indirectly*

use low-Z massive star research to constrain GRB hosts

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- hold **conferences** to build connections between GRB & massive star communities