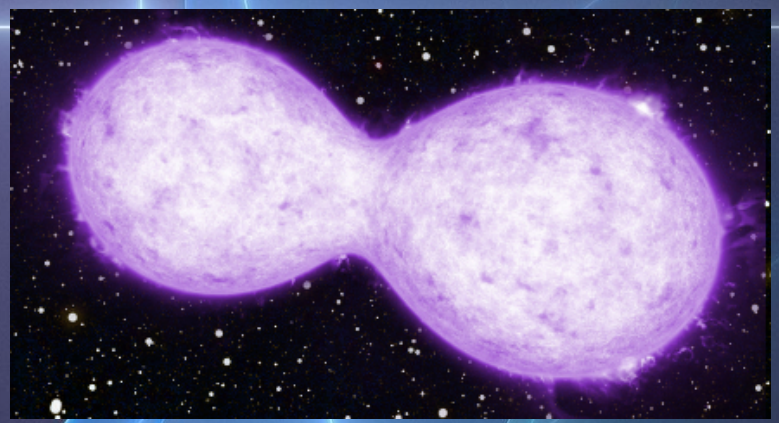
Metal-poor massive stars

The progenitors of gravitational waves

Dorottya Szécsi

Humboldt Fellow

University of Cologne



Hamburger Sternwarte
8th January 2020

Alexander von Humboldt
Stiftung/Foundation

Who am I?

Dorottya (Dory) Szécsi

Expert in

Metal-poor massive stars

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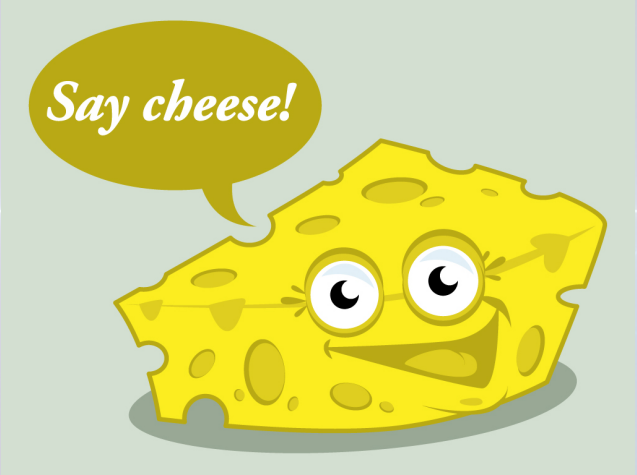

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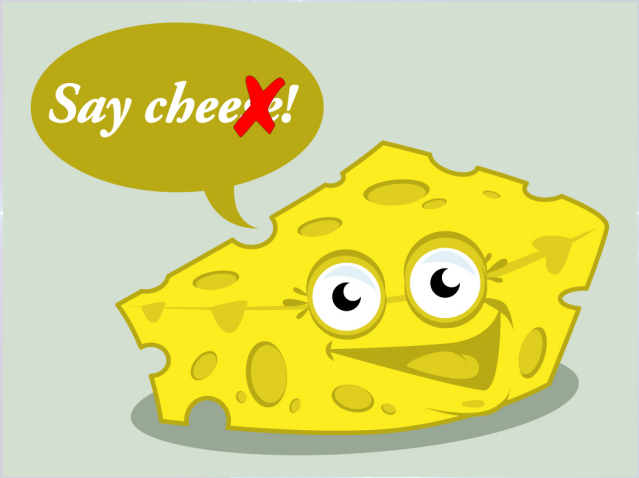

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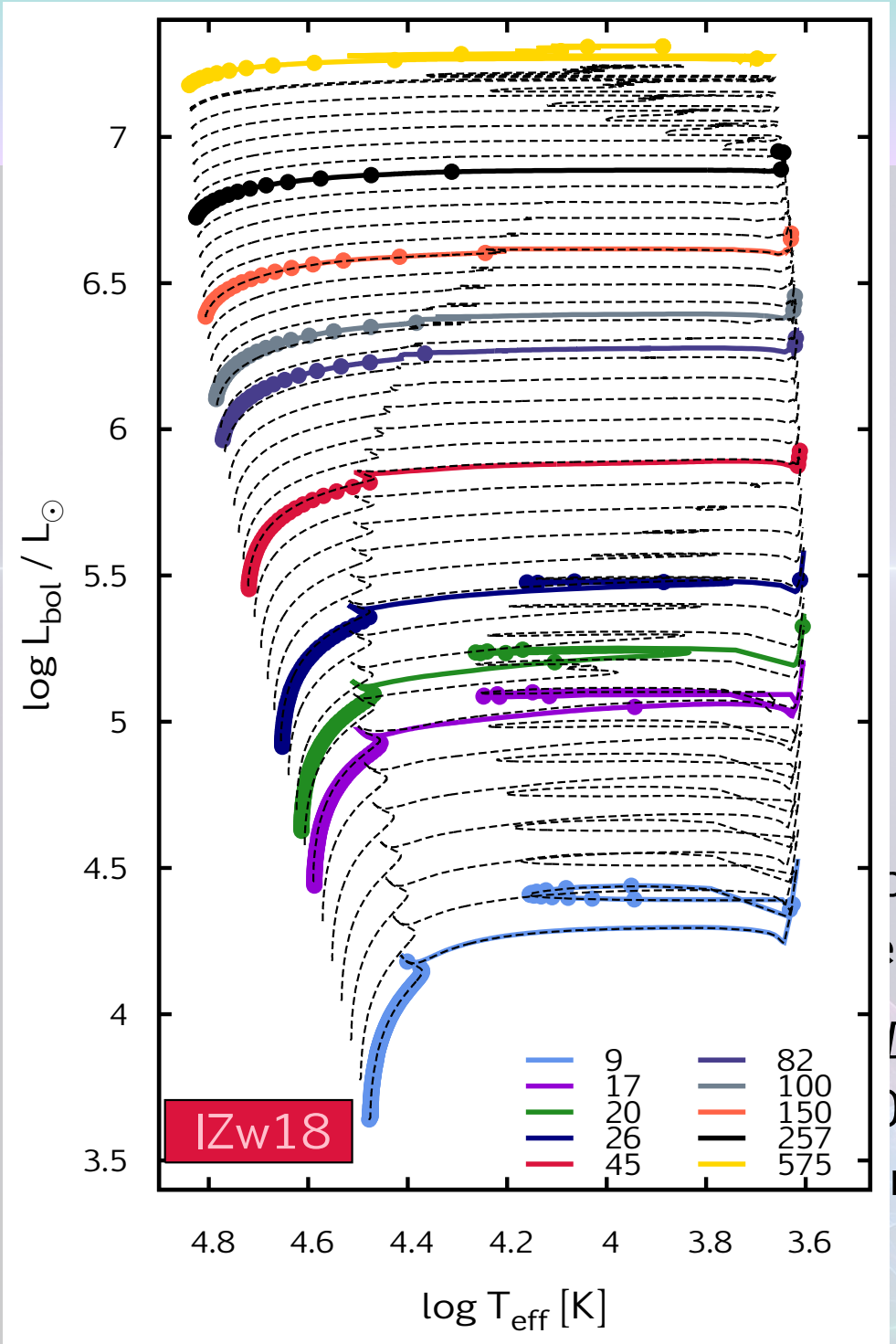

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3 GW progenitor theories

e.g. Vigna-Gómez..**Szécsi**+18; **Szécsi**'17a,b; **Szécsi**&Wünsch'19

3 GW progenitor theories

Common envelope in a binary

Chemically-homogeneous evolution in a binary

Dynamics in dense clusters

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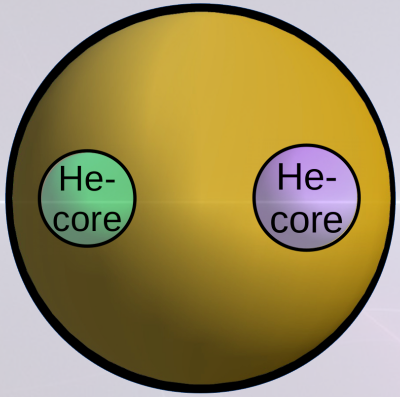

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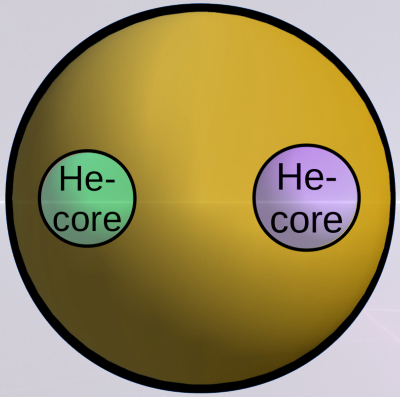

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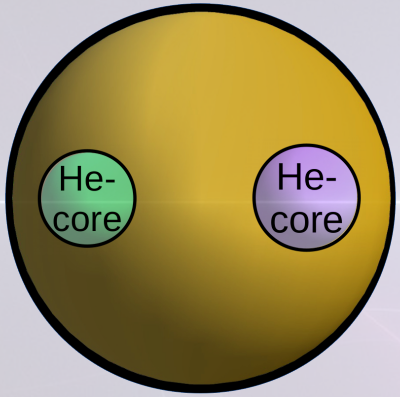

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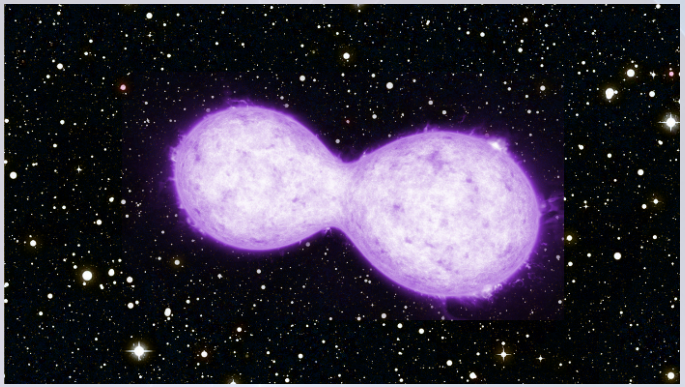


e.g. Szécsi'17a

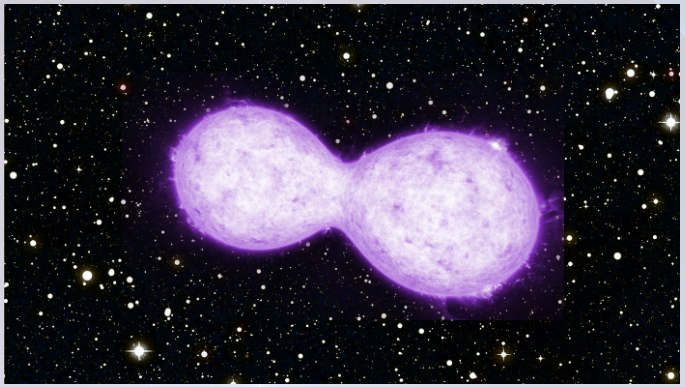
Szécsi'17b

Bagoly,Szécsi+16

Marchant+16,17

Chemically homogeneous evolution → GW

Life



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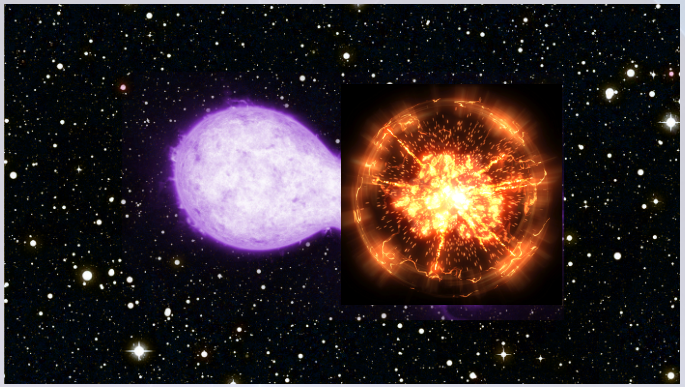

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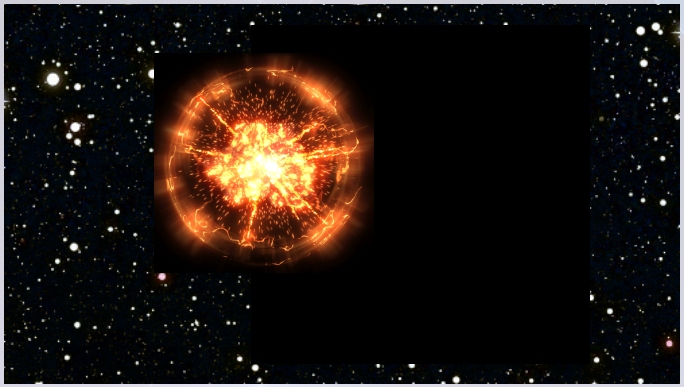

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2 Black Holes
(or Neutron Stars)

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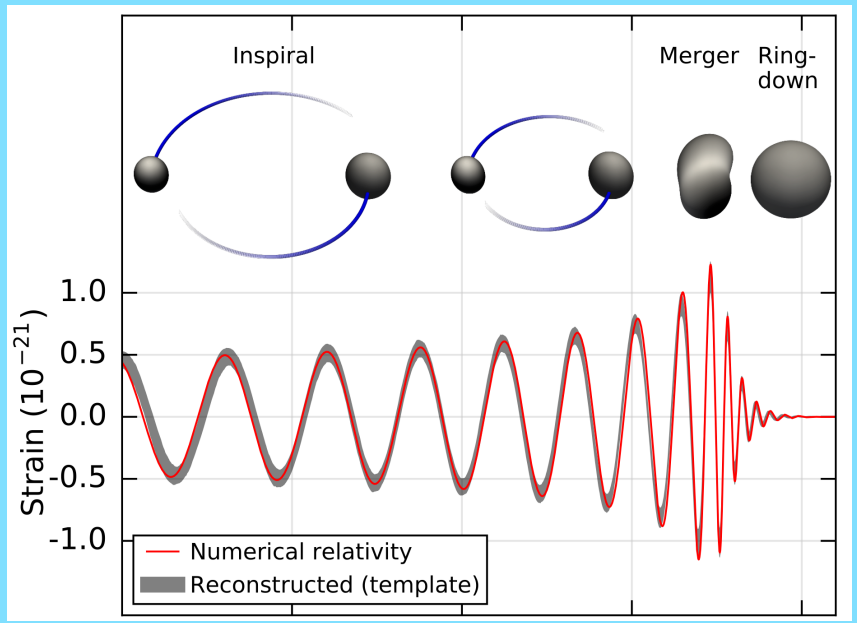
'Second death'



Credit: http://gallatin.physics.lsa.umich.edu

Merger

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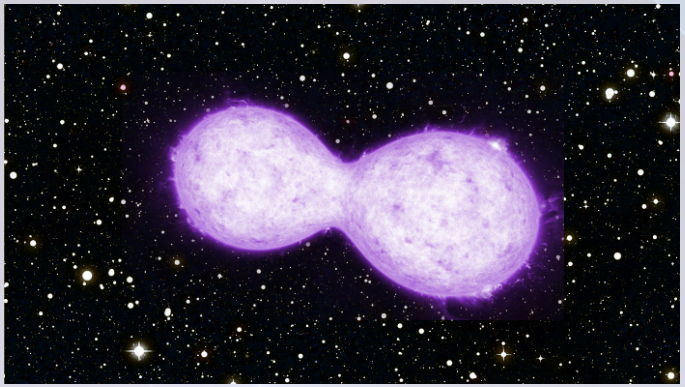

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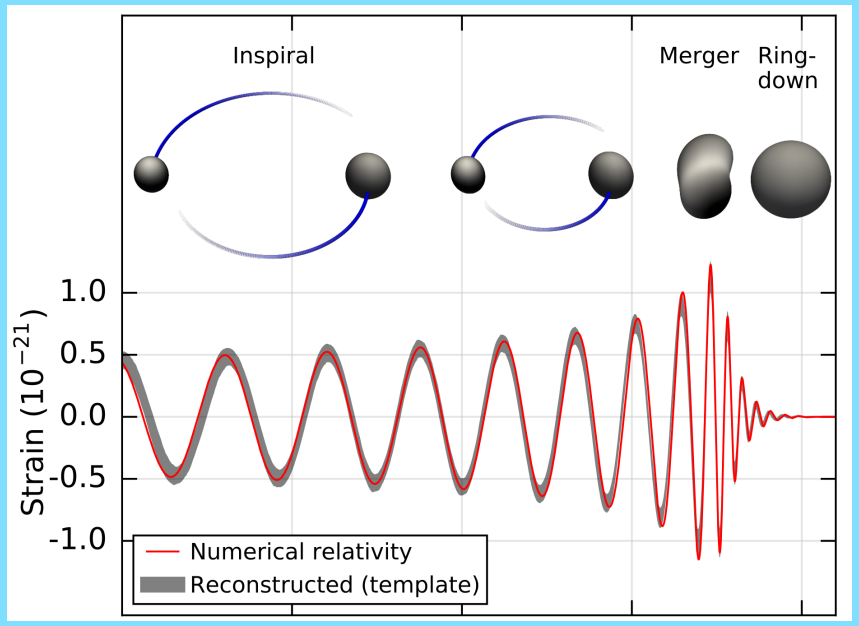

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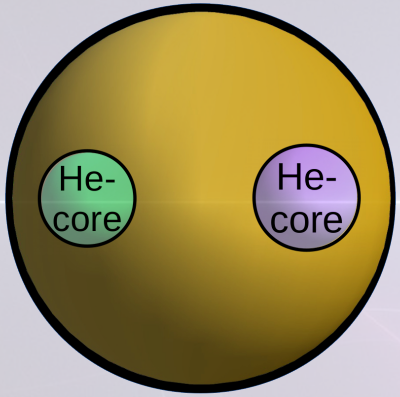

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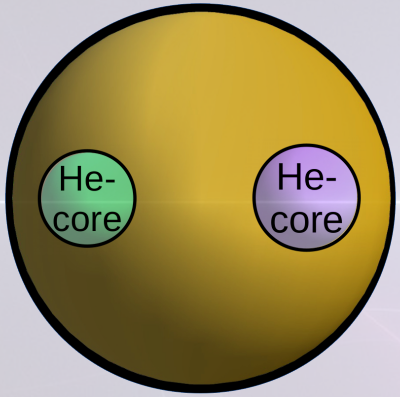

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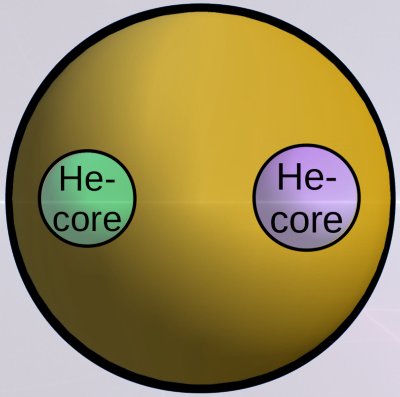

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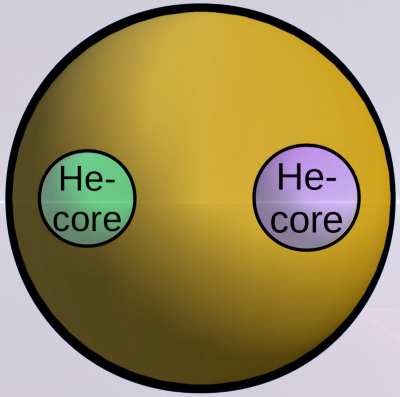

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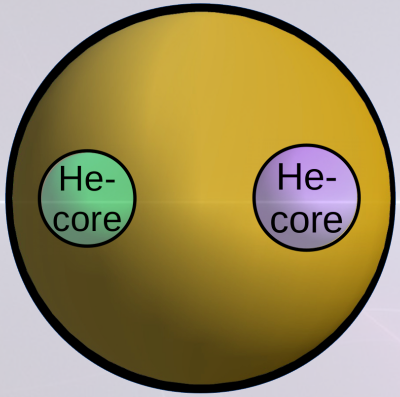

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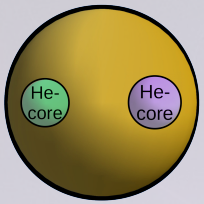

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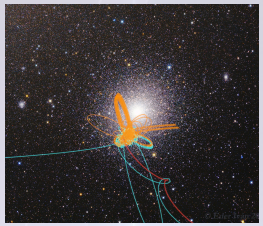

Dynamics in dense clusters

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Metal-poor massive stars

e.g. Vigna-Gómez..**Szécsi**+18; **Szécsi**'17a,b; **Szécsi**&Wünsch'19; **Szécsi**'16; Neijssel..**Szécsi**+19; Stevenson..**Szécsi**+19;

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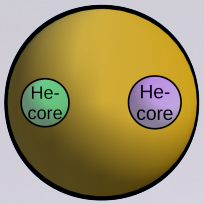

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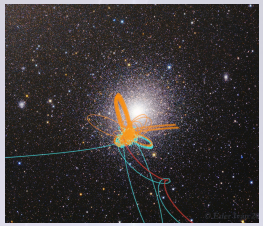

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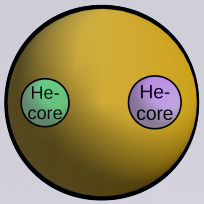

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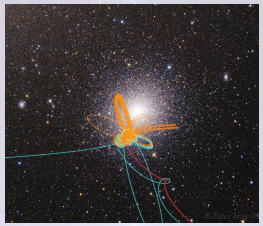

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Metal-poor massive stars

SNe, SLSNe

L-GRBs

High-mass X-ray binaries

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However...

Are these stars observed?

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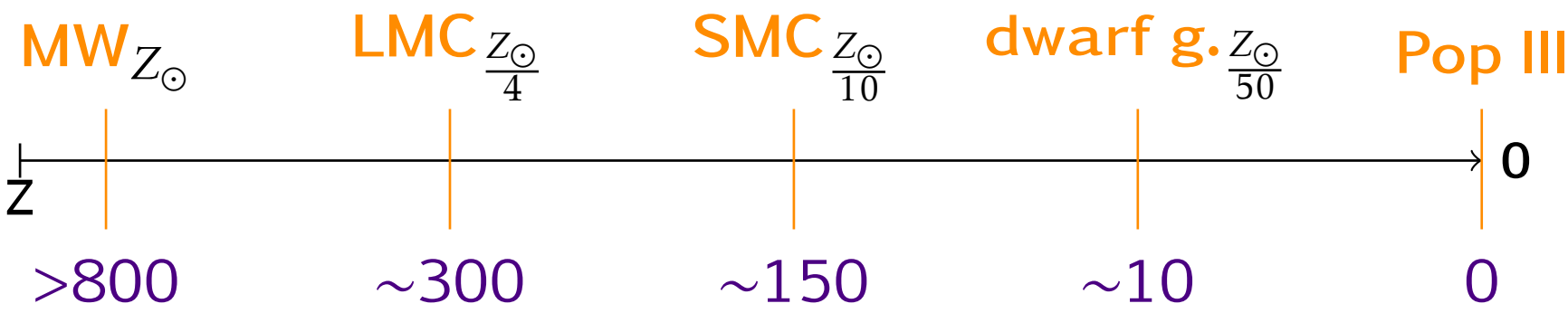

spectroscopy
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e.g. Castro+14,+18, Ramírez-Agudelo+17, Kubátová&**Szécsi**+18

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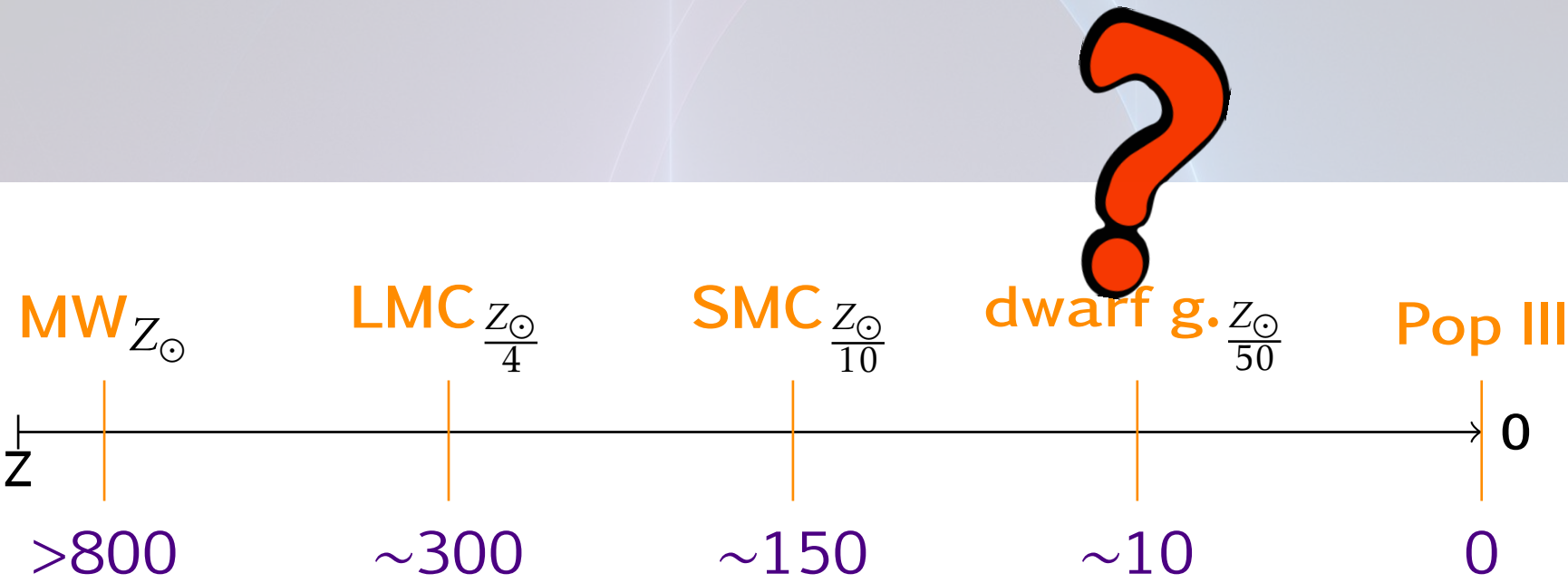

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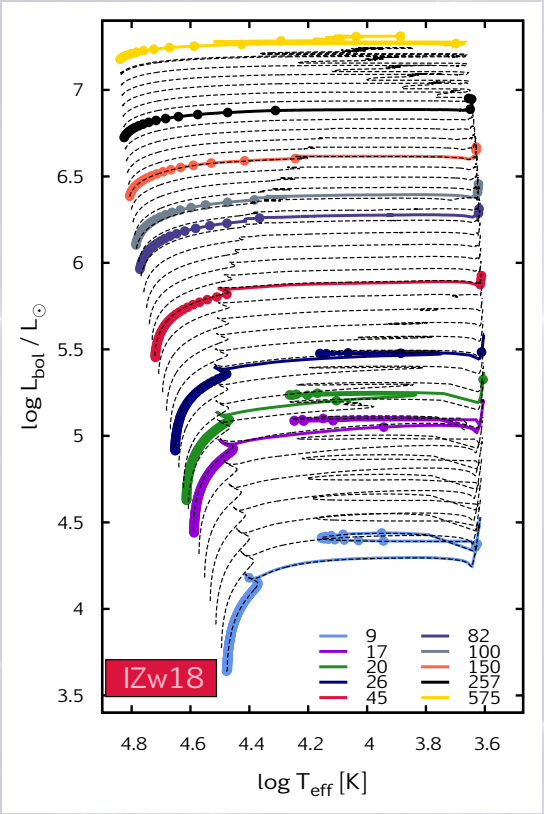
Indirect evidence!

My current research

Kubátová&**Szécsi**+18 **Szécsi**&Wünsch'19; **Szécsi**+20 (in prep.);

My current research



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My current research

Indirect evidence
= a *population* of
stars

Kubátová&**Szécsi**+18 **Szécsi**&Wünsch'19; **Szécsi**+20 (in prep.);