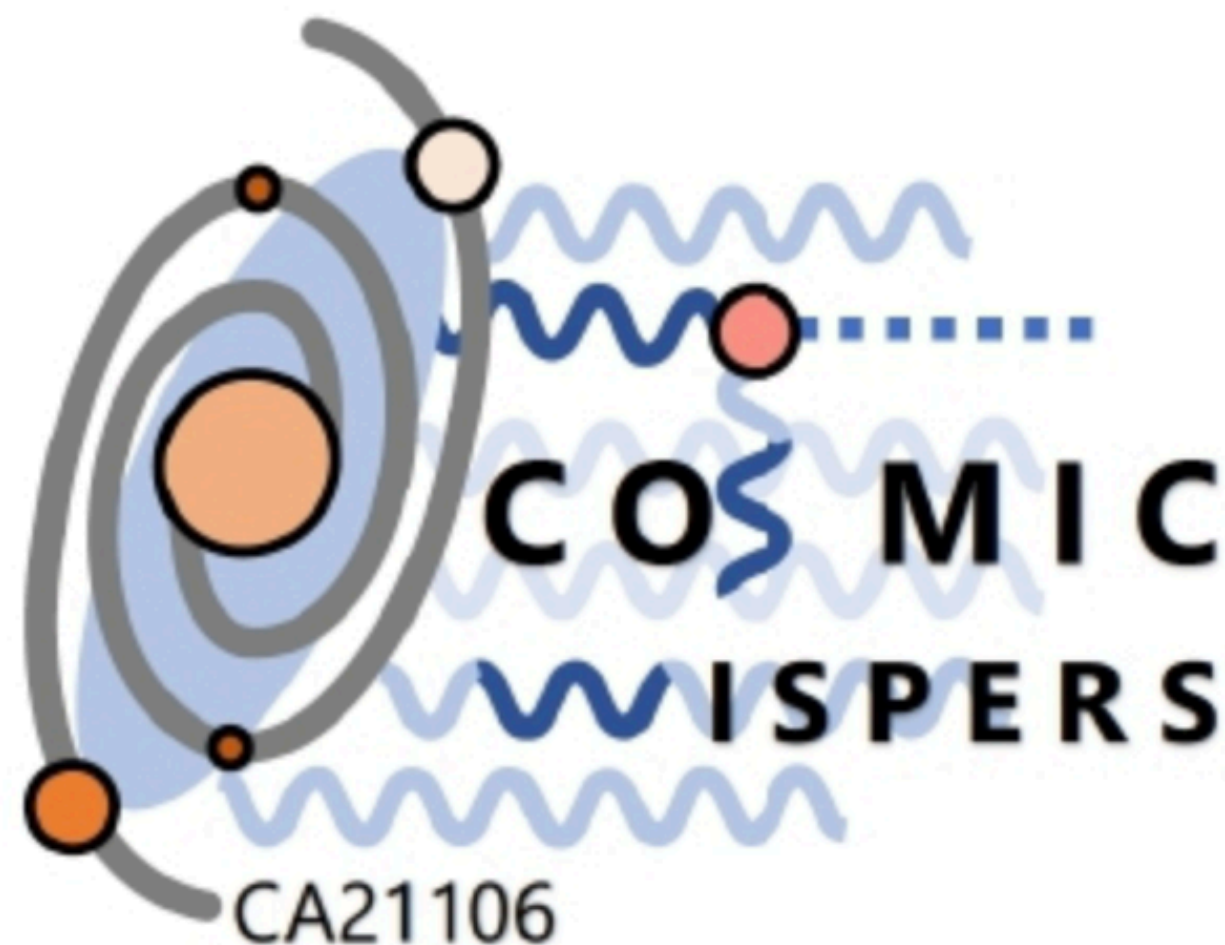


WG3: WISPs IN ASTROPHYSICS

ANDREA CAPUTO
(CERN)

KICK-OFF MEETING
COST ACTION COSMIC WISPs (CA21106)
Frascati, February 23 2023



General mission and interests of WIG3



From Alessandro's COST presentation

WG3 Organization and numbers

WG3 Leader: Andrea Caputo, andrea.caputo@cern.ch
WG3 Co-Leader: Oscar Straniero, oscar.straniero@inaf.it

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Name	Working Group	Country
Prof Joseph CONLON 	WG 1, WG 3	United Kingdom
Dr Marco CHIANESE 	WG 1, WG 3, WG 5	Italy
Mr Arturo DE GIORGI 	WG 1, WG 3	Spain
Dr Gaia LANFRANCHI 	WG 1, WG 2, WG 3, WG 4	Italy
Prof Alessandro MIRIZZI 	WG 2, WG 3, WG 5	Italy
Dr Andrea CAPUTO 	WG 2, WG 3	Israel
Dr Christoph WENIGER 	WG 2, WG 3	Netherlands
Mr Christopher ECKNER 	WG 2, WG 3	France
Dr Daniele MONTANINO 	WG 2, WG 3	Italy
Dr Edoardo VITAGLIANO 	WG 2, WG 3, WG 5	Israel











64 people already registered and present on the website, but we continue to get more applications!

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Large overlap with WG2, Dark Matter and Cosmology

WG2 Leader: Nick Rodd, nrodd@cern.ch
WG3 Co-Leader: Javier Redondo, jredondo@unizar.es

**37/64 people registered
for WG3 are also in WG2**

Activities

- Organization of Short Term Scientific Missions (STSM);

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- Publication on the webpage of a report on the scientific results of the group;

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- Participation in outreach activities;
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Basically common to all WGs

**More specific plans and
activities of WG 4**

- Organization of dedicated seminars on specific topics, intended to be more “on-hands”, very practical talks.

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Ex. Seminar on the use of MESA for BSM physics (Speakers may include Jeremy Sakstein or Maurizio Giannotti)

We welcome suggestions and ideas, write to us!

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Supernova Models
White Dwarfs, Red Giants profiles
Galactic and Extragalactic magnetic field configurations
Axions, Dark Photons, Scalars emission rates
Etc, etc.

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We

Solar Axion Flux

A C++ library to calculate the expected flux from axion-photon and axion-electron interactions inside the Sun.

Developers: [Sebastian Hoof](#) and [Lennert Thormaehlen](#)

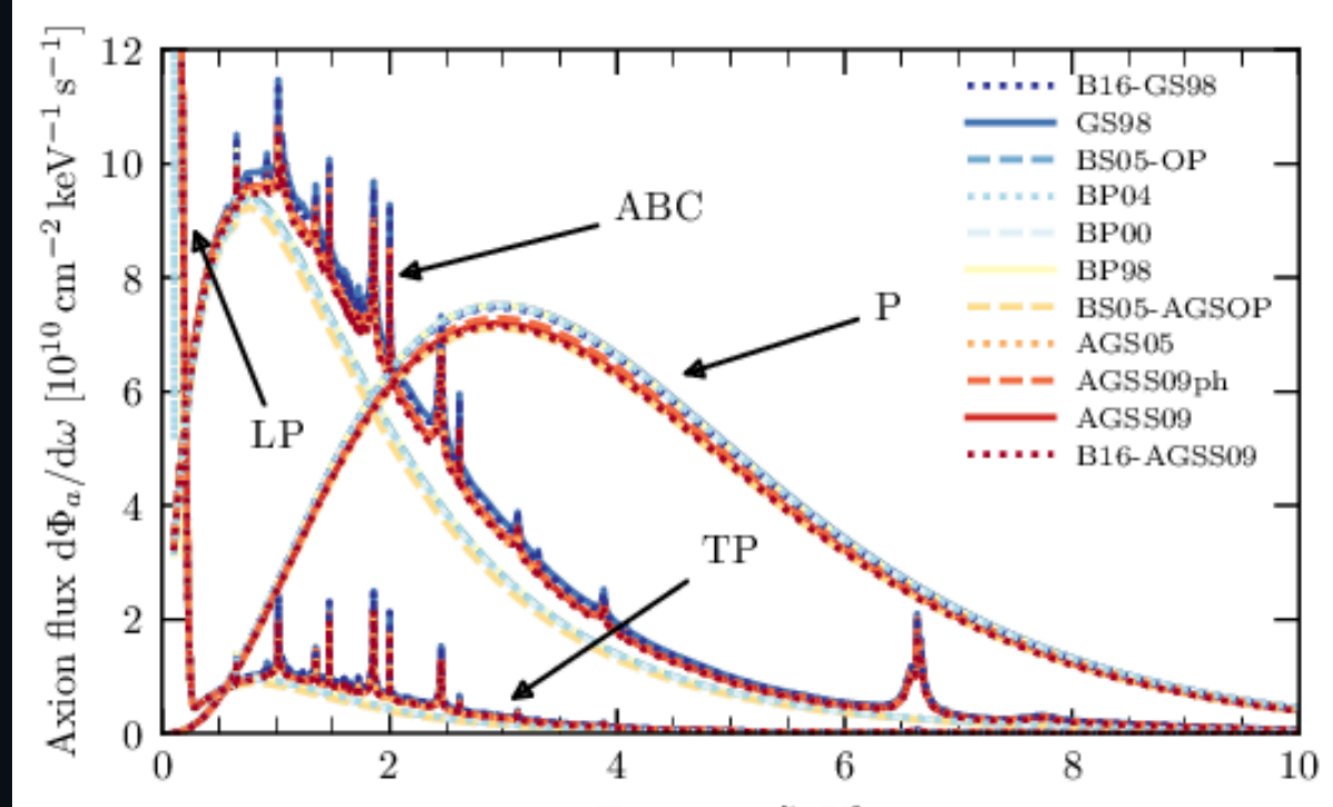
Information on **how to acknowledge this work** in the literature can be found under [References](#).

This code has been published under the BSD 3-clause license. Consult the [LICENSE](#) file for details.

Example results

We use the code for our study on “Quantifying uncertainties in the solar axion flux and their impact on determining axion model parameters.” The published paper can be found at [JCAP](#) and is also on the arXiv [arXiv:2101.08789](#)

Calculations of the axion flux from nuclear transitions were added later, in an article published at [EPJC](#), also available on the arXiv [arXiv:2111.06407](#).



te to us!

- Creation of a **important de**

Ex. This nice Github repository by Sebastian Hoof, member of the Action!

his is one of the

Supernova Models
 Pulsars, Red Giants profiles
 Exotic magnetic field configurations
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 Etc, etc.

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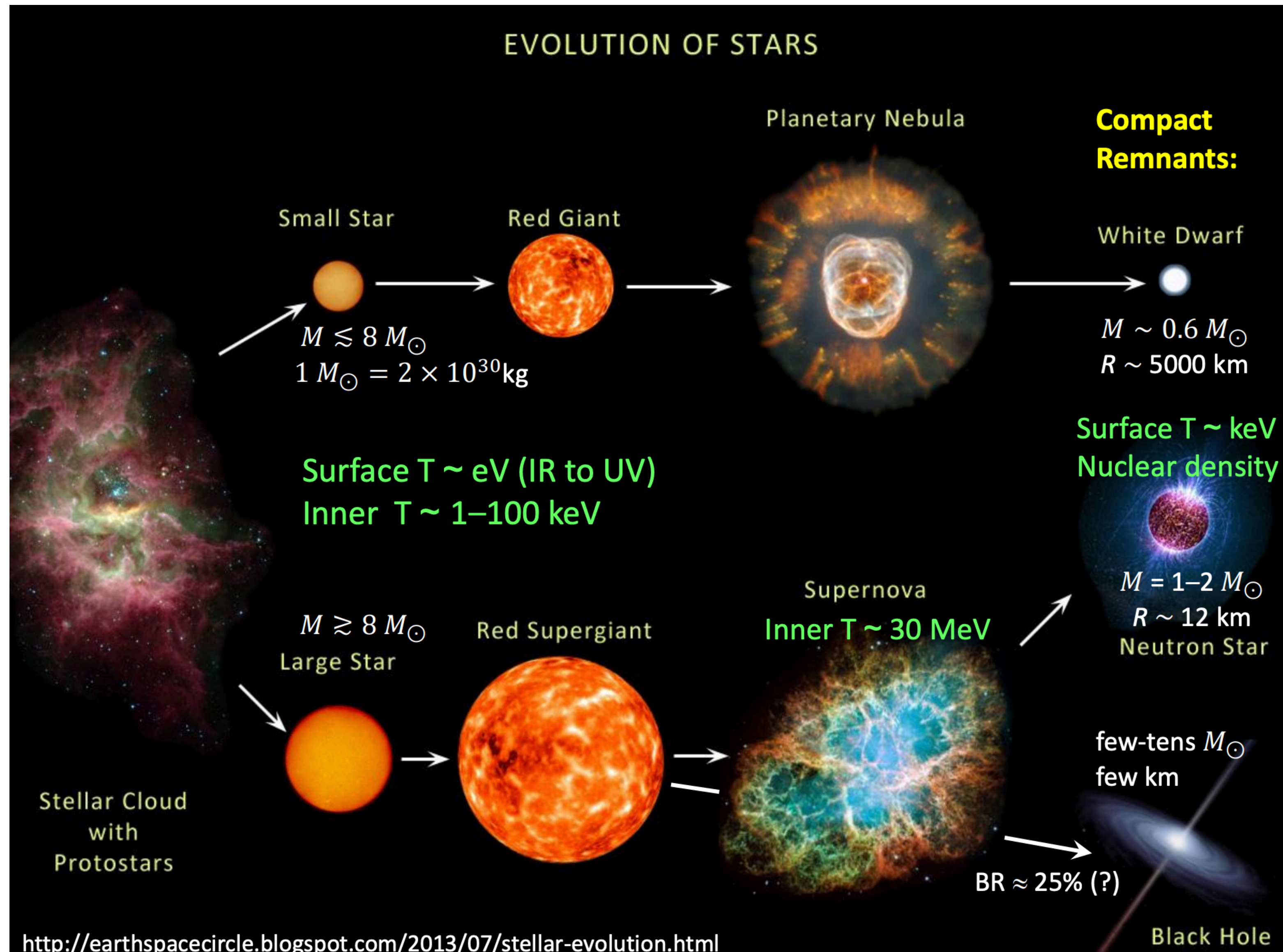
- Creation of a useful data repository (this is one of the important **deliverables!**)
- Organization for next year of **topical** mini-schools or workshop (collaboration with WG 3?)

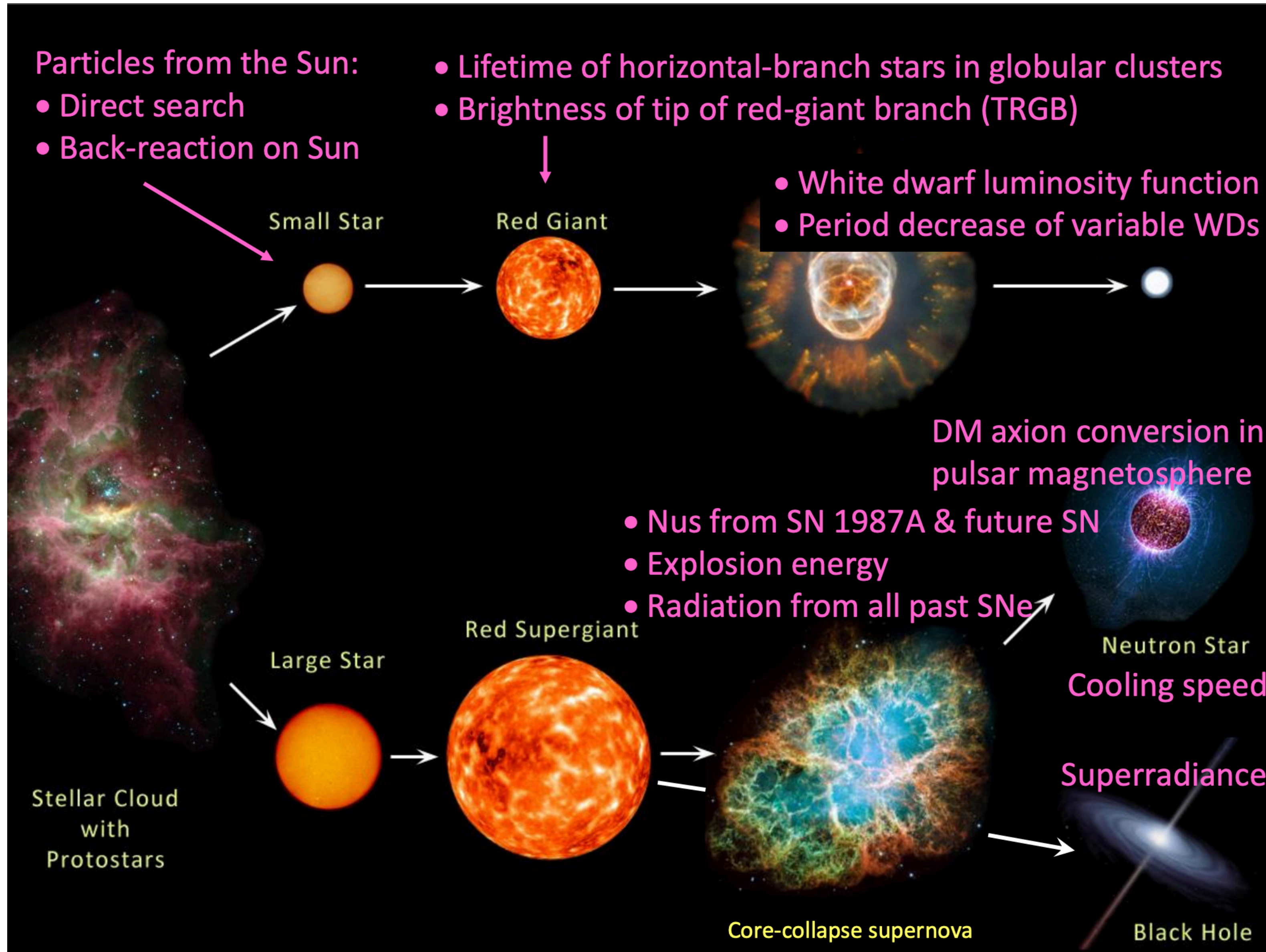
Ex. Mini-school for the use of MESA and/or SN models (at least in their simplified 1D realisations) for BSM physics

Some physics

(much) More in Oscar's talk later

EVOLUTION OF STARS





What can we expect?

- Search for solar axions
- Extension & refinements of existing arguments
- Search for magnetically converted ALPs
- Radio search for axion dark matter conversion in neutron star magnetospheres
- Next galactic supernova observation
- Gravitational-wave evidence for superradiance from black holes

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- New, out of the box ideas

Thank you for the attention

