The BoOST project: 'Bonn' Optimized Stellar Tracks.

Simulated Populations of Massive and Very Massive Stars for Astrophysical Applications

Dorottya Szécsi

Humboldt Fellow — I. Physikalisches Institut, Universität zu Köln, Germany. *Email: dorottya.szecsi@gmail.com*

Poojan Agrawal (Swinburn Univ./OzGrav)   Richard Wünsch (ASU CAS)   Norbert Langer (Bonn Univ.)

Sponsored by:

Alexander von Humboldt
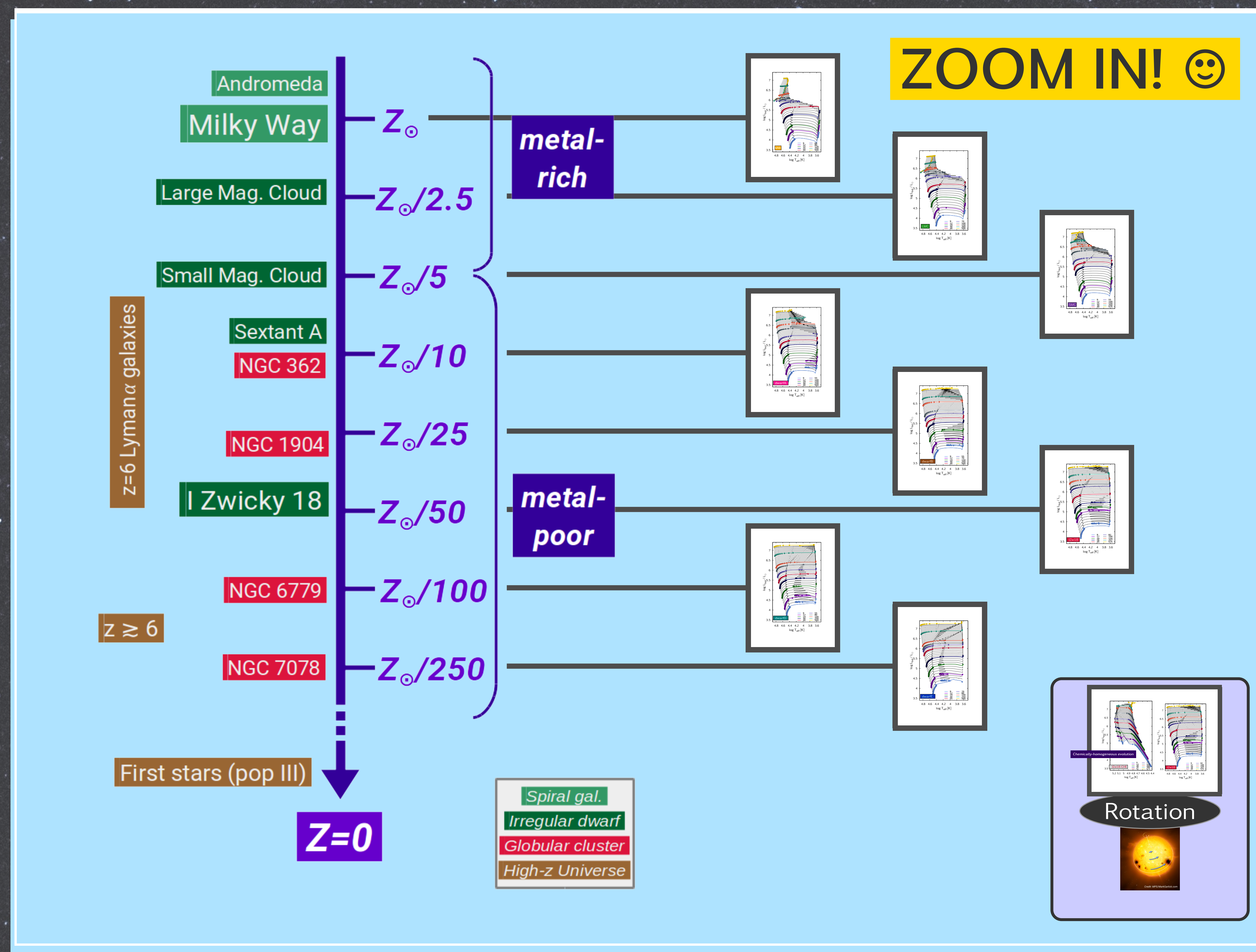Stiftung/Foundation

Summary

Massive and very massive stars play important roles in stellar populations by ejecting strong stellar winds and exploding in energetic phenomena. However, applying stellar models in various astrophysical applications requires these models to (i) include all evolutionary phases consistently and (ii) come in a user-friendly format – preferably as simple tables.

The BoOST project presents new grids of stellar models, as well as finely resolved interpolated tracks between them and synthetic populations created from them, **computed with the Bonn Code** in a physically consistent way. Stars between **9–500 M$_\odot$** and with metallicities ranging from **Galactic down to 1/250 lower** are represented.

The BoOST models are ideal as input for various applications such as *star-formation* studies with feedback, or *gravitational-wave* event rate predictions.

We welcome feedback from the audience about what else a potential next version of BoOST should contain to best serve the needs of the scientific community.

'Bonn' models → BoOST

ZOOM IN! ☺

Andromeda
Milky Way — $Z_\odot$ — **metal-rich**

Large Mag. Cloud — $Z_\odot/2.5$

Small Mag. Cloud — $Z_\odot/5$

Sextant A
NGC 362 — $Z_\odot/10$

NGC 1904 — $Z_\odot/25$

I Zwicky 18 — $Z_\odot/50$ — **metal-poor**

NGC 6779 — $Z_\odot/100$

z = 6 Lymanα galaxies

z ≳ 6

NGC 7078 — $Z_\odot/250$

First stars (pop III)

Z=0

Spiral gal.
Irregular dwarf
Globular cluster
High-z Universe

Rotation

'Bonn' Models

+ dense grids (by interpolation)

+ extended up to 500 M$_\odot$

+ post-MS phases included

+ simple tables & user support!

= BoOST

Check out the paper: *Szécsi+ 2020 (subm.)*
[arXiv:2004.08203]

Webpage: *http://boost.asu.cas.cz*

Get in touch: *dorottya.szecsi@gmail.com*