



UNIVERSITÀ
degli STUDI
di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA
"ETTORE MAJORANA"

DOTTORATO DI RICERCA IN FISICA

ANNO ACCADEMICO 2018 - 2019

STELLAR EVOLUTION

3 CFU

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Program of the course:

- 1. Introduction:** general view of the research field, equations of stellar evolution and numerical techniques, Kippenhahn diagrams, regimes of the stellar evolution and transition masses;
- 2. Stellar evolution (and associated nucleosynthesis) as a function of the initial stellar mass:** low- and intermediate-mass stars, so-called Super-AGB stars, massive stars;
- 3. Supernovae from Super-AGB and massive stars:** electron-capture supernovae, iron-core-collapse supernovae, post-explosive evolution of the ejected material and its radiation-hydrodynamical modelling;
- 4. Selected current issues:** convective overshooting in stellar evolution, supernovae progenitors, peculiar explosive events, electromagnetic counterparts of gravitational wave sources.

Bibliography:

- [–] Kippenhahn R. & Weigert A., 1990, *Stellar Structure and Evolution*, Springer-Verlag
 - [–] Herwig F., 2005, *Annu. Rev. Astron. Astrophys.*, 43, 435
 - [–] Woosley S.E., Heger A., Weaver T.A., 2002, *Rev. Mod. Phys.*, 74, 1015
- P.S. Other research papers will be suggested to cover specific topics