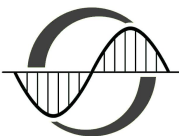




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN FISICA
CICLO XLI A.A. 2025/2026

NUCLEAR AND PARTICLE PHYSICS ASPECTS OF EXPLOSIVE ASTROPHYSICS AND MULTIMESSENGER ASTRONOMY

3 CFU

Teaching staff

Name Surname: Silvio Cherubini ; Giovanna Ferrara

Email: silvio.cherubini@dfa.unict.it ; giovanna.ferrara@dfa.unict.it

Office: 217

Office hours: Monday-Wednesday 11:00-13:00

Program of the course

- 1) Introduction to Nuclear Astrophysics.
- 2) Measurements of nuclear reactions cross sections important for nuclear astrophysics: experimental techniques and indirect methods.
- 3) Short introduction to particle physics. Special attention to neutrino sector.
- 4) Explosive phenomena as a link between nuclear and particle astrophysics.
- 5) Novae, Supernovae and other violent events in the cosmos: multi-messenger astrophysics.
- 6) Big Bang nucleosynthesis.

Bibliography

- 1) Cauldrons in the cosmos, Claus E. Rolfs and William S. Rodney, University of Chicago Press.
- 2) Gauge Theories in Particle Physics: A Practical Introduction, I. Aitchinson and A. Hey, (various editions available)
- 3) Physics of Neutrinos and Applications to Astrophysics, M. Fukugita and T. Yanagida, Springer.
- 3) Probes of multimessenger astrophysics, M. Spurio, Springer.
- 4) Selected papers in the field and notes and slides provided by the Lecturer.