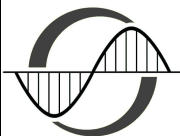




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN FISICA
CICLO XLII A.A. 2026/2027

NUCLEAR AND PARTICLE PHYSICS ASPECTS OF EXPLOSIVE ASTROPHYSICS AND MULTIMESSENGER ASTRONOMY

3 CFU

Teaching staff

Name Surname: Silvio Cherubini, Iara Tosta e Melo (4 hours)

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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. Big Bang nucleosynthesis.
- 6) Hands-on simple multi-messenger data analysis (4 hours, I. Tosta e Melo).

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