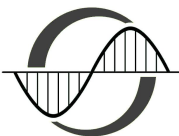




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

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

Experimental Searches for Dark Matter

2 CFU

Teaching staff

Name Surname: Marzio De Napoli

Email: marzio.denapoli@dfa.unict.it

Office: Edificio 6 Dip. di Fisica e Astronomia (DFA) Stanza 345

Reception hours: Thursday 9:30 – 12:30 (To ensure efficient organization, please send an email in advance)

Program of the course:

- Observational evidence for Dark Matter (DM)
- WIMPs and other DM candidates
- Properties of the expected DM signals in Direct Detection experiments
- Background sources and possible mitigation strategies
- Experimental techniques: detection of light, charge, and heat
- Dual-phase liquid noble gas detectors, LAr-TPC, cryogenic Ge, bolometers, TES, SQUIDS, CCD, CaWO₄ crystals and others.
- Introduction to statistical methods for data analysis
- Introduction to DM searches at accelerators
- The Dark Photon and Light Dark Matter hypothesis
- Experimental techniques for the Dark Photon visible decay search
- Search for invisible decays: missing mass, missing energy, missing momentum experiments, and Beam-dump experiments

Bibliography:

Scientific paper and slides provided by the teacher