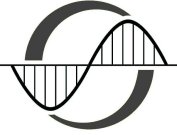




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

DOTTORATO DI RICERCA IN FISICA
CICLO XXXIX A.A. 2023/2024

Physics and Astrophysics of Neutron Stars

2 CFU

Teaching staff: dr.ssa Fiorella Burgio

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Reception hours:

Program of the course:

Lect 1: Introduzione allo studio degli oggetti compatti: BH, WD and NS. Cenni storici. Scoperta delle pulsars. Dati osservativi su masse e raggi: telescopi, interferometri, satelliti.

Lect 2: General Relativity in a nutshell. TOV equations, maximum mass.

Lect 3: Overview of the nuclear strong and weak forces. Beta-equilibrium and Equation of state (EoS).

Lect 4: Theoretical methods for the calculation of the EoS. Comparison with observational and laboratory data.

Lect 5: Strange matter in the core: hyperons and mesons.

Lect 6: The hadron-quark phase transition in the stellar core.

Lect 7: Gravitational wave astronomy: Non-radial oscillations and binary mergers.

Bibliography:

Scientific papers and slides provided by the teacher