



UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA

DOTTORATO DI RICERCA IN FISICA
CICLO XXXVII

ANNO ACCADEMICO 2021/22

Physics and Astrophysics of Neutron Stars

2 CFU

Teaching staff

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Program of the course

Lect. 1. Neutron Stars : a general overview – Observations vs. theory.

Lect. 2. Structure and EoS of Neutron Star Crusts – Cold equation of state below the neutron drip point.

Lect. 3. The inner core – Cold equation of state above the neutron drip point.

Lect. 4. The nuclear many-body problem – Theoretical methods for the equation of state of the inner core.

Lect. 5. Strange matter in the inner core : Hyperons and kaons.

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

Lect. 7. Gravitational waves astronomy – Neutron Stars Binary mergers.

Each lecture will last 2 hours.

Bibliography:

- P. Haensel, A.Y. Potekhin, D. G. Yakovlev, “Neutron Stars I. Equation of State and Structure” Springer - Verlag, 2007
- M. Baldo and F. Burgio, “Properties of the nuclear medium”, Rep. Prog. Phys. **75** (2012) 026301
- S. Shapiro and S. Teukolsky, “Black Holes, White Dwarfs and Neutron Stars, Wiley Verlag, 2004