UNIVERSITÀ degli STUDI di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA

DOTTORATO DI RICERCA IN FISICA
CICLO XXXVI

ANNO ACCADEMICO 2020/21

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 nd Neutron Stars, Wiley Verlag, 2004