UNIVERSITÀ degli STUDI di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA

DOTTORATO DI RICERCA IN FISICA

ANNO ACCADEMICO 2017 - 2018

MAGNETIC FIELDS IN NEUTRON STARS

2 CFU

Teaching staff
Alessandro Lanzafame
Email: a.lanzafame@unict.it
Office: Sezione Astrofisica DFA - INAF-Osservatorio Astrofisico di Catania
Telephone: +39 095 7332239
Reception hours: Thursday 10:00 – 12:00

Program of the course:

Observational data overview of pulsars and magnetars
Conditions of core collapse supernovae and formation of neutron stars
Neutron star internal structure
Neutron star atmosphere and magnetosphere
Fossil magnetic field
Magnetic field amplification by dynamo action in young neutron stars
Magnetic field dissipation
Spin-down and age of neutron stars
Superfluidity and “glitches”

Bibliography:

- Padmanabhan T. 2000 - Theoretical Astrophysics, Cambridge University Press
- Stix M. 2002 - The Sun, an introduction, Springer
- Rüdiger G., Hollerbach R. 2005 - The Magnetic Universe: Geophysical and Astrophysical Dynamo Theory, Wiley
- Kaspi V., Beloborodov A. 2017 - Magnetars,Annual Review of Astronomy and Astrophysics, Vol. 55:261-301
- Duncan R., Thompson C. 1992 - Formation of very strongly magnetized neutron stars - Implications for gamma-ray bursts, Astrophysical Journal, Part 2 vol. 392
- Thompson C., Duncan R. 1993 - Neutron star dynamos and the origins of pulsar magnetism, Astrophysical Journal, Part 1 vol. 408