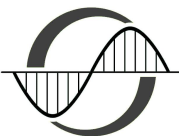




UNIVERSITÀ
degli STUDI
di CATANIA



DIPARTIMENTO DI FISICA E ASTRONOMIA
“ETTORE MAJORANA”

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

EXOPLANETS

2 CFU

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Reception hours: 11-12 a.m. Monday and Friday by appointment

Program of the course:

1. **Introduction:** A general view of the field and the key questions
2. **Detection:** The different observations techniques: Radial Velocities, Imaging, Transits, Microlenses, Timing, Astrometry. Methods; challenges; Results to date.
3. **Census of exoplanets:** distribution in mass and size, multiplanetary systems; orbits, eccentricity, rotation, abundances. Host stars.
4. **Planetary formation theories:** Terrestrial planet formation, Giant planet formation, Tidal effects, Population synthesis, Orbital migration
5. **Exoplanet atmospheres and Habitability:** Observation techniques; hot, warm and temperate planets. Transmission and emission spectroscopy. Phase curves. Atmospheric retrieval method, The concept of habitability. Results to date.
6. **Facilities for exoplanets:** Present and future facilities from ground to space.

Bibliography:

- [1] M. Perryman, *The Exoplanet Handbook*, 2018, 2nd edition, Cambridge Univ. Press
- [2] C.A Haswell, *Transiting Exoplanets*, 2010, Cambridge Univ. Press
- [3] K. Heng, *Exoplanetary Atmospheres*, 2017, Princeton University Press
- [4] S. Seager, *Exoplanets*, The University of Arizona Press.

Recent research papers will be suggested to cover specific topics of this rapidly evolving field.