ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ASTRONOMY, ASTROPHYSICS AND COSMOLOGY

Understanding the content and evolution of the Universe.

The research of the University of Bologna covers a wide range of topics:

- Stellar population studies based on space imaging in the UV (HST, GALEX, AstroSat), optical (HST), and infrared (Spitzer), and on ground-based spectroscopy
- Physics and evolution of galaxies and AGNs based on space data across the entire electromagnetic spectrum
- Cosmology and dark matter studies with gravitational lensing, galaxy clusters, large scale structure and neutral hydrogen
- End-to-end simulations of imaging and spectroscopic data
- Statistical analysis of large datasets
- Numerical simulations for astrophysics and cosmology

HIGHLIGHTS

The University of Bologna participates in the following space missions and projects: ESA Euclid cosmological mission to address the key questions of dark energy and modified gravity (top-level responsibilities in management and science); AMS (Antimatter Magnetic Spectrometer): the study of antimatter and dark matter through a cosmic ray detector on the ISS (International Space Station); eROSITA, on-board of the "Spectrum-Roentgen-Gamma" satellite to survey the whole sky in the X-rays; ESA Athena X-ray space mission to address the cosmic evolution of black holes and large massive structures; Indian Space Telescope AstroSat; Space VLBI RadioAstron Project; ERC Advance Grant "COSMIC-LAB" on stellar physics and evolution; ERC Advance Grant "GLENCO" on gravitational lensing; ERC Starting Grant "DRANOEL" on radio emission in galaxy clusters; ERC Starting Grant "MAGCOW" on extragalactic magnetic fields; FP7 CIG "eEASy" on active galaxies "FP7 CIG "INACMa" on early life and palaeoenvironmental reconstructions; National funded projects: Euclid mission, MIUR-SIR "SIMCODE" on cosmological simulations, MIUR-FARE "SMS" on magnetic fields in galaxy clusters; HST (Hubble Space Telescope) Large Project on stellar populations; ENGRAVE & GRAWITA projects for the identification and study of the electromagnetic counterparts of gravitational waves PAPSSN (Pan-African Planetary and Space Science Network).

Infrastructures and collaborations

Open Physics Hub: multi-purpose laboratory for the development of new generation sensors and detectors, high-speed computing and data visualization.

Different research groups have established an extensive **network of collaborations** with several universities, agencies, institutions and research centers at national and international level, such as: ASI (Italian Space Agency), INAF (National Institute for Astrophysics), INFN (National Institute for Nuclear Physics), ESA, NASA, JPL (Jet Propulsion Laboratory – NASA), DOE (U.S. Department of Energy), ESO (European Southern Observatory), MPE (Max Planck Institute for Extraterrestrial Physics).