PhD thesis available for Cycle 37 (2021-2024)

10 PhD positions are available in this cycle.

3 positions are funded by DIFA(UNIBO). The thesis have to be selected among the following 24 proposals

DIFA(UNIBO) – Project 1
Testing Axion Dark Matter Models with N-body cosmological simulations of large-scale structures at different scales
Supervisor: Marco Baldi (email: marco.baldi5@unibo.it)

DIFA(UNIBO) – Project 2
Testing fundamental physics with numerical simulations of the cosmic large- scale structures
Supervisor: Marco Baldi (email: marco.baldi5@unibo.it)

DIFA(UNIBO) – Project 3
Hidden Black Holes in the Deep Universe
Supervisor: Marcella Brusa (email: marcella.brusa3@unibo.it)

DIFA(UNIBO) – Project 4
Black Hole Weather:Unveiling the micro and macro processes of SMBH feeding and feedback
Supervisor: Marcella Brusa (email: marcella.brusa3@unibo.it)

DIFA(UNIBO) – Project 5
"Constraining the expansion of the Universe with the oldest stars"
Supervisor: Andrea Cimatti (email: a.cimatti@unibo.it)

DIFA(UNIBO) – Project 6
"*Playing with the physics of Blue Stragglers*"
Supervisor: Francesco R. Ferraro (email: francesco.ferraro3@unibo.it)

DIFA(UNIBO) – Project 7
AGN feeding-feedback cycle in cool core clusters with Hα nebulae
Supervisor: Myriam Gitti, Fabrizio Brighenti (email: myriam.gitti@unibo.it)

DIFA(UNIBO) – Project 8
"*Understanding the role of gas circulation in the evolution of star-forming galaxies*"
Supervisor: Federico Marinacci (email: federico.marinacci2@unibo.it)

DIFA(UNIBO) – Project 9
Forming Milky Way-like galaxies in cosmological simulations with explicit ISM and feedback models
Supervisor: Federico Marinacci (email: federico.marinacci2@unibo.it)

DIFA(UNIBO) – Project 10
"Cosmology with Bayesian deep neural networks to learn the properties of the Cosmic Web "
Supervisor: Federico Marulli (email: federico.marulli3@unibo.it)

DIFA(UNIBO) – Project 11
"Cosmology from the combination of multiple observational probes
Supervisor: Federico Marulli (email: federico.marulli3@unibo.it)

DIFA(UNIBO) – Project 12
"Strong Gravitational Lensing: simulating and modelling "
Supervisor: R. Benton Metcalf (email: robertbenton.metcalf@unibo.it)

DIFA(UNIBO) – Project 13
"Weak Gravitational Lensing with the Lyman-alpha Forest "
Supervisor: R. Benton Metcalf (email: robertbenton.metcalf@unibo.it)

DIFA(UNIBO) – Project 14
"Machine Learning Tools for Weak and Strong Lensing by Galaxy Clusters: Paving the Way to the ESA-Euclid Mission".
Supervisor: Lauro Moscardini (email: lauro.moscardini@unibo.it)

DIFA(UNIBO) – Project 15
"Observational cosmology with MeerKAT HI intensity mapping."
Supervisor: Lauro Moscardini (email: lauro.moscardini@unibo.it)

DIFA(UNIBO) – Project 16
"Chemical characterization of the Milky Way merger events: identifying the chemical DNA of our Galaxy."
Supervisor: Alessio Mucciarelli (email: alessio.mucciarelli2@unibo.it)

DIFA(UNIBO) – Project 17
"Very metal-poor stars as local relics of the ancient Universe"
Supervisor: Alessio Mucciarelli (email: alessio.mucciarelli2@unibo.it)

DIFA(UNIBO) – Project 18
"Globular Cluster evolution in dwarf satellites "
Supervisor: Carlo Nipoti (email: carlo.nipoti@unibo.it)

DIFA(UNIBO) – Project 19
"Multi-component models of stellar systems with distribution functions depending on actions "
Supervisor: Carlo Nipoti (email: carlo.nipoti@unibo.it)

DIFA(UNIBO) – Project 20
"Rotating astrophysical fluids with baroclinic distributions"
Supervisor: Carlo Nipoti (email: carlo.nipoti@unibo.it)

DIFA(UNIBO) – Project 21
"Bulge/Disk decomposition of galaxies for the 21th century: characterization of the components, and link with the galaxy properties, using MaNGA kinematics and SDSS photometry."
Supervisor: Silvia Pellegrini (email: silvia.pellegrini@unibo.it)

DIFA(UNIBO) – Project 22
"Simulating the evolution of radiogalaxies in the cosmic web ."
Supervisor: Franco Vazza (email: franco.vazza2@unibo.it)

DIFA(UNIBO) – Project 23
"Tracing the Early Cluster Assembly with Accreting Black Holes."
Supervisor: Cristian Vignali (email: cristian.vignali@unibo.it)

DIFA(UNIBO) – Project 24
"The realm of dual super-massive black holes"
Supervisor: Cristian Vignali (email: cristian.vignali@unibo.it)

3 positions are funded by INAF. The thesis have to be selected as follows

INAF1
" The variable and multi-messenger sky with CTA"
Supervisor: Andrea Bulgarelli andrea.bulgarelli@inaf.it

INAF2
"LISCA: Lively Infancy of Star Clusters and Associations"
Supervisor: Emanuele Dalessandro - emanuele.dalessandro@inaf.it

INAF3 One choice among the following 9 projects

INAF3 – Project 1
Observations of Fast Radio Bursts with the Northern Cross
Supervisor: Dr. Gianni Bernardi, Dr. Maura Pilia **(**gianni.bernardi@inaf.it, maura.pilia@inaf.it)

INAF3 – Project 2
Physics of non-thermal components in galaxy clusters and the LOFAR revolution
Supervisor: Dr. Gianfranco Brunetti (brunetti@ira.inaf.it)

INAF3 – Project 3
The role of relativistic jets in the assembly of the first supermassive black holes: a multi-band approach
Supervisor: Dr. Marcello Giroletti (marcello.giroletti@inaf.it)

INAF3 – Project 4
VLBI and time measurement: how radio astronomy and metrology can benefit from the use of Time and Frequency reference signals generated by national metrological institutes and provided to radio astronomy and geodesy observatories.
Supervisor: Dr. Monia Negusini, Federico Perini (monia.negusini@inaf.it, federico.perini@inaf.it)

INAF3 – Project 5
Searching for water on Mars: global mapping of the dielectric properties at the base

of the Martian polar caps
Supervisor: Dr. Roberto Orosei (roberto.orosei@inaf.it)

INAF3 – Project 6
Development of techniques and tools for the image processing of radar signals for the observation of planetary bodies: from the subsurface of Mars to asteroids
Supervisor: Dr. Roberto Orosei (roberto.orosei@inaf.it)

INAF3 – Project 7
Study of magnetic field in Galaxies from dust polarized emission
Supervisor: Dr. Rosita Paladino (rosita.paladino@inaf.it)

INAF3 – Project 8
Exploiting deep radio surveys to assess the growth of black holes and the role of jet-induced AGN feedback in galaxy evolution
Supervisor: Dr. Isabella Prandoni (prandoni@ira.inaf.it)

INAF3 – Project 9
"Solar Physics and Space Weather with the Medicina 32-m Radio Telescope: Development, Test and Scientific Exploitation of a Spectro-Polarimetric Imaging System for Solar Radio Astronomy"
Supervisor: Dr. Simona Righini, Alberto Paolo Pellizzoni (simona.righini@inaf.it, alberto.pellizzoni@inaf.it)

Four positions funded by specific scientific projects

MAGNETIC
Magnetic fields in the large-scale structure
Supervisor : Annalisa Bonafede (annalisa.bonafede@unibo.it)

HIGH-REDSHIFT
Searching for high-redshift progenitors of massive galaxies
Supervisor: Andrea Cimatti (a.cimatti@unibo.it)

LIGHT-ON-DARK
Light-on-Dark: the physics of Globular cluster core
Supervisor: F.R. Ferraro (francesco.ferraro3@unibo.it)

HIGH-PRECISION
High-precision stellar astrophysics: testing models of stellar structure using asteroseismic, astrometric, and spectroscopic constraints
Supervisor : Andrea Miglio (andrea.miglio@unibo.it),