UNIVERSITÀ DEGLI STUDI
DELL'INSUBRIA

In the following you will find examples of master and PhD theses performed and discussed at the Insubria University. They are divided in areas and for each thesis, you can read the summary (in Italian) and the introduction (in English). For some of them, there is also the link to the complete thesis.

The following areas are presented:

- **Astrophysics**
- **Complex Systems**
- **Condensed Matter Physics**
- **Detector and Particle physics**
- **Medical Physics**
- **Optics**
- **Physics Education**

UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

Astrophysics

Matteo Bonetti, PhD – POST-NEWTONIAN EVOLUTION OF MASSIVE BLACK HOLE TRIPLETS IN GALACTIC NUCLEI - awarded with the SAIT 2018 Tacchini Prize as best PhD thesis in theoretical astrophysics (see also full text)

Andrea Caldiroli – HYDRODYNAMICS OF ATMOSPHERIC ESCAPE FROM EXOPLANETS (see also full text)

Federica Ciocca, PhD – COLOUR GRADIENTS IN CLUSTER ELLIPTICALS AT Z~1.4: THE HIDDEN CONTENT OF THE GALAXY CENTRAL REGIONS (see also full text)

Francesco Coti-Zelati, PhD – OBSERVING NEUTRON STARS AT THE MAGNETIC EXTREMES

Matteo Genoni, PhD - TOWARDS THE EXTREMELY LARGE TELESCOPES ERA IN EXOPLANETARY SCIENCE: SIMULATION TOOLS, INSTRUMENTAL OPTIMIZATION AND DESIGN FOR HIGH RESOLUTION SPECTROSCOPY. THE CASES OF ESPRESSO AND ELT-HIRES - awarded with the SAIT 2018 Tacchini Prize as best PhD thesis in technologic astrophysics

Ilaria Lonoce, PhD – THE HIDDEN COMPLEXITY OF STELLAR POPULATION PROPERTIES IN HIGH REDSHIFT EARLY-TYPE GALAXIES (see also full text)

Alessandro Lupi, PhD – BLACK HOLES IN GALACTIC NUCLEI: SEED FORMATION FROM STELLAR MASS BLACK HOLES AND MASSIVE BLACK HOLE PAIRING IN GALAXY MERGERS (see also full text)

Faizan Gohar Mohammad, PhD - TOWARDS UNBLASED ESTIMATES OF THE GROWTH RATE OF STRUCTURE THROUGH OPTIMISED TRACERS AND TECHNIQUES

Francesco Nappo, PhD - COMBINING DYNAMICS AND RADIATION IN GRB AFTERGLOWS

Alessio Pescalli, PhD - POPULATION PROPERTIES, DISSIPATION AND RADIATIVE PROCESSES IN GRBS

Daniele Pizzocaro, PhD – MULTI-WAVELENGTH OBSERVATIONS OF VARIABILITY CHARACTERIZING MAGNETIC ACTIVITY IN LATE-TYPE STARS

Chiara Righi, PhD – NEUTRINO EMISSION FROM BLAZARS

Davide Rozza, PhD – ASTROPHYSICAL SOURCES FOR THE OBSERVED ELECTRON AND POSITRON AXCESS AT HIGH ENERGY WITH AMS-02 EXPERIMENT (see also full text)

Bianca Salmaso, PhD – ANGULAR RESOLUTION IMPROVEMENT OF SLUMPED THIN GLASS OPTICS FOR X-RAY TELESCOPES

Federico Vincentelli, PhD - MULTIWAVELENGTH FAST VARIABILITY IN BLACK-HOLE X-RAY BINARIES

Tommaso Zana, PhD – BARRED GALAXIES IN COSMOLOGICAL SIMULATIONS. TIDAL PERTURBATIONS AND FEEDBACK (see also full text)

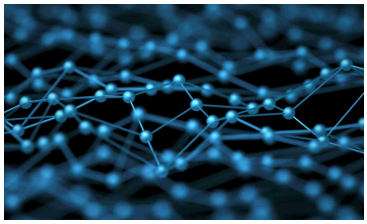
UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

Complex systems

Manuele Onofri – CAMMINI ALEATORI PERSISTENTI

Gaia Pozzoli – LEGGI LIMITE PER PROCESSI STOCASTICI E ANOMALIE

Mattia Radice – RANDOM WALK: PROBLEMI DI PRIMO PASSAGGIO NEL CASO DI TRASPORTO ANOMALO



Matter and Condensed Matter Physics

Silvia Bonfanti, PhD – LOW TEMPERATURE THEORETICAL AND NUMERICAL STUDY OF STRUCTURAL GLASSES (see also full text)

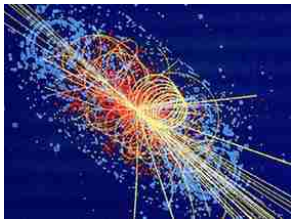
Gaia Colombo – THERMAL FORCES IN COLLOIDAL SUSPENSIONS

Maria Conti – ANALOGUE GRAVITY IN BECS: A COMPARISON BETWEEN THE SEMICLASSICAL PICTURE AND AN EXACT FERMIONIC APPROACH (see also full text)

Maksym Paliienko, PhD – MULTIPLE-WELLED TUNNELLING SYSTEMS IN GLASSES AT LOW TEMPERATURES (see also full text)

Manuele Tettamanti, PhD – ANALOGUE HAWKING RADIATION IN BOSE-EINSTEIN CONDENSATES

Pietro Anzini, PhD – FLUIDS AT INTERFACES: CASIMIR EFFECT, DEPLETION AND THERMO-OSMOSIS



Detector and Particle Physics

Giovanni Ballerini – TESTING COHERENT SCATTERING CHANNELING PHENOMENA FOR THE K_LEVER PROJECT (see also full text)

Stefano Capelli – THE READOUT ELECTRONICS OF THE ENUBET CALORIMETER (see also full text)

Daniele Guffanti – THE FAMU EXPERIMENT: MEASUREMENT OF MUONIC ATOMS SPECTRA (see also full text)

Mattia Soldani – MUonE: A HIGH-ENERGY SCATTERING EXPERIMENT TO STUDY THE MUON $g-2$ (see also full text)

Alessandro Berra, PhD – SILICON PHOTOMULTIPLIERS IN HIGH ENERGY AND SPACE APPLICATIONS (see also full text)

Davide Bolognini, PhD – THE MICE ELECTRON MUON RANGER: A FUNDAMENTAL STEP TOWARDS A NEUTRINO FACTORY (see also full text)

Claudia Brizzolari, PhD – THE PROTOTYPE PHASE OF THE ENUBET POSITRON TAGGER (see also full text)

Said Hasan, PhD – EXPERIMENTAL TECHNIQUES FOR DEFLECTION AND RADIATION STUDIES WITH BENT CRYSTALS (see also full text)

Daniela Lietti, PhD – VISION: A VERSATILE AND INNOVATIVE SILICON TRACKING SYSTEM (see also full text)

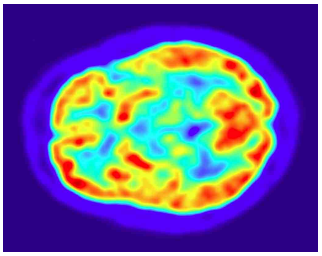
Massimiliano Antonello, PhD - EXPLOITING THE POTENTIAL OF DUAL-READOUT CALORIMETRY BY INTRODUCING A SILICON PHOTOMULTIPLIER LIGHT SENSING SYSTEM (see also full text)

Loretta Negrini - MIMOTERA: A SILICON PIXEL DETECTOR FOR BEAM PROFILOMETRY (see also full text)

Massimiliano Antonello (in italian) - INTEGRAZIONE DI UN MONITOR DI FASCIO DI ANTI-PROTONI ULTRA-SOTTILE AD ALTA RISOLUZIONENELL?ESPERIMENTO AEGIS AL CERN (see also full text)

Luca Malinverno **-** CHARACTERIZATION OF SCINTILLATION NEUTRON DETECTORS WITH SILICON PHOTOMULTIPLIER READOUT FOR NUCLEAR SECURITY (see also full text)

Stefano Guatieri (tesi esterna, SUPSI) **-** WIRELESS SENSOR NETWORK FOR A RADON CONCENTRATION MEASUREMENT SYSTEM (see also full text)



Medical Physics

Samuele Cotta – CHARACTERIZATION OF AN ACTIVE DETECTOR FOR NEUTRON FLUX MEASUREMENTS (see also full text)

Marta Duchini – A DYSPROSYUM NEUTRON DOSIMETER FOR RADIOTHERAPY LINEAR ACCELERATORS (see also full text)

Matteo Maspero – INTEGRATED DAQ SYSTEM FOR A SCINTILLATING FIBER NEUTRON DOSIMETER (see also full text)

Lisa Milan – SEGMENTATION ALGORITHMS IN ^{18}F – FDG PET/CT ONCOLOGICAL IMAGES: COMPARATIVE ANALYSIS IN THE PMBCL MODEL

Chiara Novati – A MULTICHANNEL TISSUE-EQUIVALENT DOSIMETER FOR RADIOTHERAPIC BEAMS (see also full text)

Chiara Romanò – PERFORMANCE ASSESSMENT OF THE ALBIRA TRI-MODAL PRE-CLINICAL SPECT SYSTEM

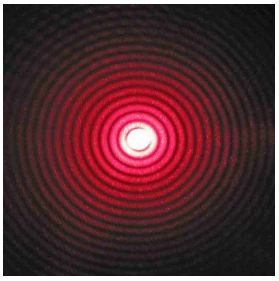
Michele Signoriello – DOSIMETRIC EVALUATION OF A NEW IMPLEMENTED 3D PHOTON TREATMENT PLANNING (see also full text)

Linda Panero, PhD (in italian) - MONITORAGGI DI GAS RADON INDOOR E STUDIO DEL FATTORE DI EQUILIBRIO (see also full text)

Valentina Arosio, PhD - DEVELOPMENT OF A SILICON PHOTOMULTIPLIER BASED INNOVATIVE AND LOW COST POSITRON EMISSION TOMOGRAPHY SCANNER (see also full text)

Monica Beretta - A SILICON PHOTOMULTIPLIER BASED INNOVATIVE POSITRON EMISSION TOMOGRAPHY SYSTEM (see also full text)

Samuela Lomazzi (in italian) - ANALISI SPERIMENTALE DEGLI ASPETTI CRITICI NELLO SVILUPPO DI UNA SONDA PER CHIRURGIA RADIOGUIDATA (see also full text)



Optics

Giovanni Caiazzo – PHOTON-NUMBER-RESOLVING DETECTORS FOR ADVANCED CONTINUOUS-VARIABLE QUANTUM INFORMATION PROCESSING (see also full text)

Silvia Cassina – DETECTING MESOSCOPIC QUANTUM STATES OF LIGHT WITH SIPM (see also full text)

Marco Lamperti – ON THE PROPERTIES OF OPTICAL TWIN-BEAM STATES (see also full text)

Marco Lamperti, PhD – MEASURING THE STATISTICS OF LIGHT. APPLICATIONS TO QUANTUM OPTICS AND BIOPHYSICS (see also full text)

Alessandro Tucci Bronzuoli (in italian) – SIMULAZIONE DI GIOCHI QUANTISTICI SU IBM Q (see also full text)

Giovanni Chesi, PhD – A NON CLASSICAL JOURNEY FROM THE OPTIMIZATION OF SILICON PHOTOMULTIPLIERS FOR QUANTUM OPTICS TO QUANTUM SECOND-HARMONIC GENERATION (see also full text)

Valeria Viviana Belloni - STUDY AND OPTIMIZATION OF BESSEL BEAM MICROMACHINING TECHNIQUES FOR HOLE DRILLING IN TRANSPARENT MATERIALS (see also full text)

Davide Valetti (in italian) - MICROLAVORAZIONE LASER CON FASCI DI BESSEL IMPULSATI PER FORATURA E LIMATURA DI MATERIALI TRASPARENTI

Marco Selva (in italian)- MICROLAVORAZIONE E INTERAZIONE RADIAZIONE-MATERIA IN MATERIALI TRASPARENTI MEDIANTE FASCI DI BESSEL (see also full text)

Erica Invernizzi (in italian) - GENERAZIONE DI FASCI GEMELLI MEDIANTE UNA POMPA MODULATA SPAZIALMENTE (see also full text)

Sanjeev Kumar, PhD – BEAM SHAPING AND APPLICATIONS: TAILORING BESSEL BEAMS FOR LASER MICROMACHINING AND FOR PARTICLE ACCELERATION IN PLASMA WAKEFIELD (see also full text)

Simone Bonanomi (tesi esterna, Università degli Studi di Milano) **-** MICROFABRICATION OF TRANSPARENT MATERIALS BY MEANS OF PULSED CONICAL WAVES (see also full text)

Valerio Garzillo (tesi esterna, Università degli Studi di Milano, in italian) **-** INTERAZIONE RADIAZIONE-MATERIA CON IMPULSI DI BESSEL E APPLICAZIONI ALLA MICROLAVORAZIONE LASER DI MATERIALI TRASPARENTI (see also full text)

Physics Education

Antonella Pugliese – PHYSICS AND MISCONCEPTIONS: AN INNOVATIVE APPROACH FOR PHYSICS DIDACTICS (see also full text)

Simone Rabaioli – COSMIC RAYS, A TOOL FOR DIDACTICS IN PHYSICS (see also full text)

Fabrizio Favale, PhD (in italian) – DISTANZA TRA DOCENTI E STUDENTI NELLA PERCEZIONE DELLO STUDIO DELLA FISICA: VALUTAZIONE E PROPOSTE DI DIDATTICA LABORATORIALE (see also full text)

Armanda Ferrarini, PhD (in italian) – FAR CRESCERE LE COMPETENZE: ESPERIMENTI DI DIDATTICA LABORATORIALE DALLA PRIMARIA ALLA SECONDARIA DI SECONDO GRADO (see also full text)