Graduate Course
in Physics
University of Pisa

2005

Physics Done

- Gravitational Physics
- Theoretical Physics
- Condensed Matter Physics
- Atomic Physics
- High Energy Experimental Physics
- Astrophysics/Astroparticle Physics
- Medical Physics
- Plasma Physics
- Laser Physics

Research Groups, Staff Members

(University,INFN,CNR,INFM,SNS)

- INFN (Experimental) ~ 200 physicists;
- INFN (Theory) ~ 60;
- INFM (Experimental and theoretical) ~ 50;
- Medical Physcis ~ 15;
- Astrophysics ~ 10
- Gravitaional Physics ~ 10-15

Graduate Board

KONISHI KENICHI (Pres.)	P.O.	FIS/02	GE
ANSELMI DAMIANO	Ric.	FIS/02	
ARIMONDO ENNIO	P.O.	FIS/03	GE
BELLETTINI GIORGIO	P.O.	FIS/04	
BEMPORAD CARLO	P.O.	FIS/01	GE
BEVERINI NICCOLO`	P.A.	FIS/03	
BRACCINI PIER LUIGI	P.O.	FIS/01	GE
CAVASINNI VINCENZO	P.O.	FIS/01	GE
COSTANTINI FLAVIO	P.O.	FIS/01	
DELL'ORSO MAURO	P.A.	FIS/01	
DI GIACOMO ADRIANO	P.O.	FIS/02	GE
FABROCINI ADELCHI	P.O.	FIS/04	
FLAMINIO VINCENZO	P.O.	FIS/01	GE
GIORGI MARCELLO	P.O.	FIS/01	GE
GIULIETTI DANILO	P.A.	FIS/01	
GROSSO GIUSEPPE	P.O.	FIS/03	GE
GUADAGNINI ENORE	P.O.	FIS/02	GE
MENOTTI PIETRO	P.O.	FIS/02	GE
MINGUZZI PAOLO	P.O.	FIS/01	GE
MORUZZI GIOVANNI	P.A.	FIS/01	
PAFFUTI GIAMPIERO	P.O.	FIS/02	GE
PEGORARO FRANCESCO	P.O.	FIS/03	
PICASSO LUIGI ETTORE	P.O.	FIS/01	GE
PIERAZZINI GIUSEPPE	P.O.	FIS/01	
ROSSI PAOLO	P.O.	FIS/02	GE
SHORE STEVE	P.O.	FIS/05	
STEFANINI ARNALDO	P.O.	FIS/07	
STRUMIA FRANCO	P.O.	FIS/03	
TONELLI GUIDO	P.O.	FIS/01	
TONELLI MAURO	P.O.	FIS/03	
VICARI ETTORE	P.A.	FIS/02	
MARTINELLI MASSIMO		DIRETTORE IPCF	
CASTALDI RINO		DIRETTORE INFN	
LAMANNA GIANLUCA		Rappresentante dei Dottoranti	
CASTORINA ERSILIO		Rappresentante dei Dottorandi	

http://www.df.unipi.it/dida/dottorat/hp.html

Secretary of the Graduate Course in Physics:

Ms. Paola Cecchi

Tel 050-2214888
cecchi@df.unipi.it

Secretary of the Graduate School “Galileo Galilei” :

Ms. Maria Pia SanVito

Tel 050-2213285
sanvito@dm.unipi.it

http://www.df.unipi.it/dida/fisica.applicata/fisappl.html
http://www.di.unipi.it/galilei/

Reserch Groups:

I. Theory Group (INFN)

Quantum Field Theory and Statistical Mechanics

- -Lattice QCD
- -Quantum gravity, Supersymmetric gauge theories
- -Perturbative QCD, composite quarks
- -Spin glass, critical behavior of polymers
- -Coherent fluid and quantum dynamics of Bose condensation
- -Nonperturbative QCD
- -Dynamics of SU(N) gauge theories, Strong CP
- -QFT Approach to ctitical phenomena
- -IR problem in QED e QCD
- -Nonperturbative dynamics,confinement
- -Differential geometry, branes and string theory
- -Dynamical systems, Crystal liquid
- -History of Physics

Nuclear Physics

- - Theory of nuclear reactions, radioactive nuclei
- - Equation of state
- - Many-body Physics
- - Few-body dynamics
- - Hadronic matter at high densities

Physics of Fundamental Interactions

- - Neutrino physics, Standard model and extensions
- - Supersymmetry, MSSM
- - Confinement and XSB in QCD
- - Models with extradimensions
- - Inflation

II. Condensed Matter Physics

Research subjects

* Non-linear phenomena, laser cooling, matter waves
* Probe Microscopy
* Laser Ablation
* Laser matter interaction at high intensities
* Electron-phonon dynamics and Jahn-Teller effect
* Linear and nonlinear ESR spectroscopy in the slow motion regime
* Radiofrequency spectroscopic and quantum electronics
* Molecular Spectroscopy
* Spectroscopy with coherent sources
* Collective phenomena in plasmas
* Nonlinear dynamics in plasmas
* Liquid crystals: electrooptical and magnetooptical surface properties
* Nonlinear and stochastic behaviour of physical systems
* Dielectric behaviour and transport properties of macromolecular systems
* Electronic and structural properties of electronic polymers
* Electronic states in perfect crystals, superlattices and aperiodic structures, quantum transport in nanostructures
* New materials for laser application

III. Astrophysics

Solar system

Solar Physics

Stellar Physics

Interstellar Medium and the Milky Way Galaxy

Extragalactic and Cosmology

IV. High-Energy Experimental Physics (INFN)

Experiments

BaBar: CP violation measurement at the B-factory, SLAC

VIRGO: an interferometer for gravitational waves detection,Cascina, Pisa

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AMS: The Alpha Magnetic Spectrometer (AMS) built from an international collaboration, aboard the International Space Station (ISS): the search for dark matter and antimatter.

APE Group: Supercomputer System

ATLAS: LHC Experiment; search for Higgs particles/ search for supersymmetry,CERN

NOMAD: Neutrino Oscillation Magnetic Detector at CERN

NA48/2: CP violation measurement in Kaon systems, CERN

CDF: pbar-p Collider Experiments at Fermilab,Discovery of Top, B-Physics

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ANTARES: An undersea experiment for the detection of very high energy neutrinos of galactic/extragalactic origin, Tolone

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NEMO: Development of a future cubic kilometer underseas detector for a measurement of the flux of high energy galactic/extragalactic origin, Capo Passero-Catania

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KLOE: CP violation measurement at the Phi-factory, Frascati

CMS:(The Compact Muon Solenoid): LHC Experiment; search for Higgs particles/ search for supersymmetry, CERN

CLUE: (Cerenkov Light Ultraviolet Experiment, La Palma, Canary Islands, Spain. Measurement of the ration of matter/antimatter in the cosmic ray

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MAGIC Telescopio
Canary Island, Spagna

CREAM: Study of ultra high-energy cosmic rays by Ultra Long Duration Baloon in Antartilde

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MEG: Decadimento di mu / decadimenti rari, PSI, Zurigo

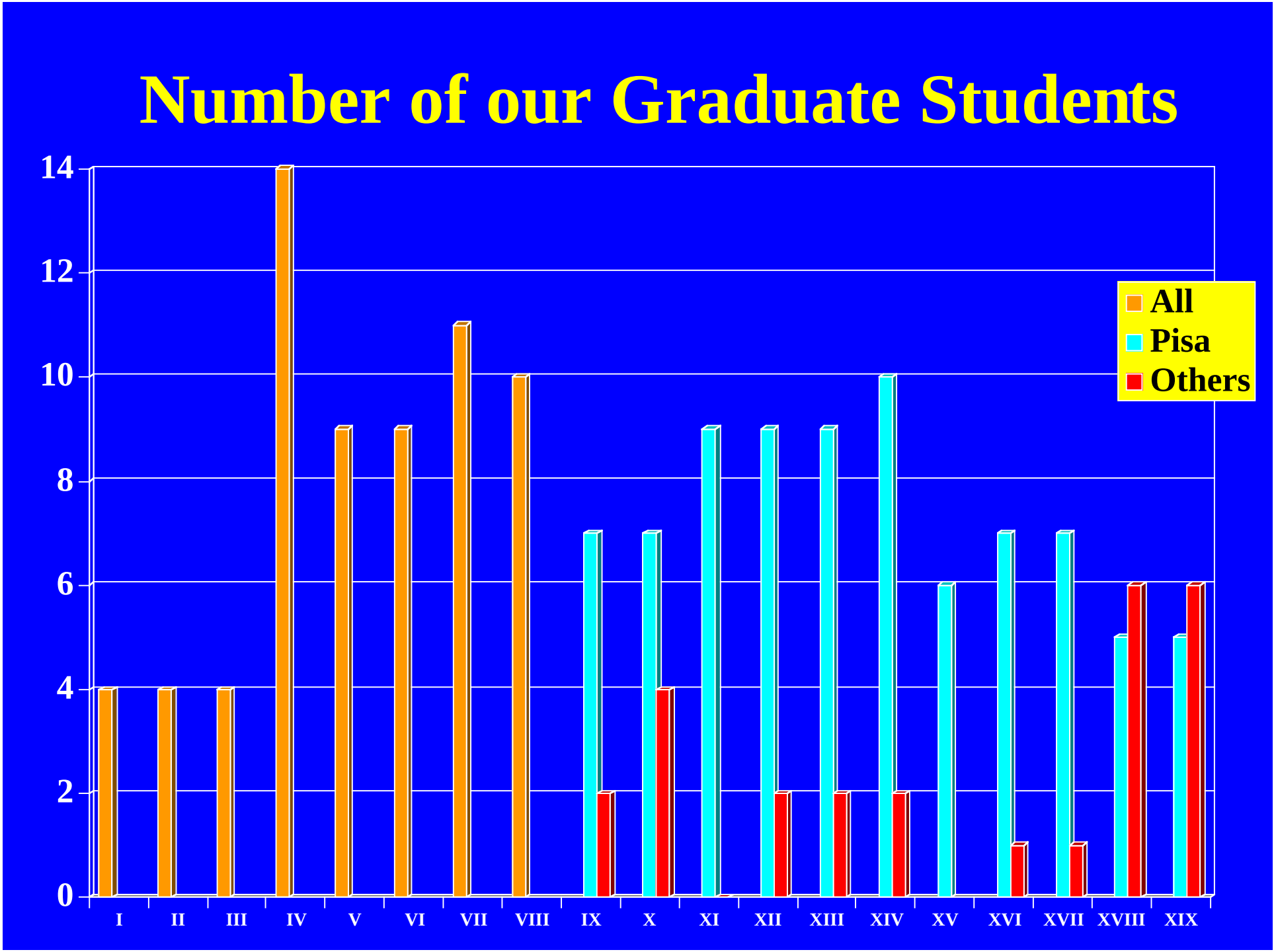
GLAST:(Gamma Ray Large Area SpaceTelescope)Gamma ray astronomy.

GRUPPO V Experimental apparatus

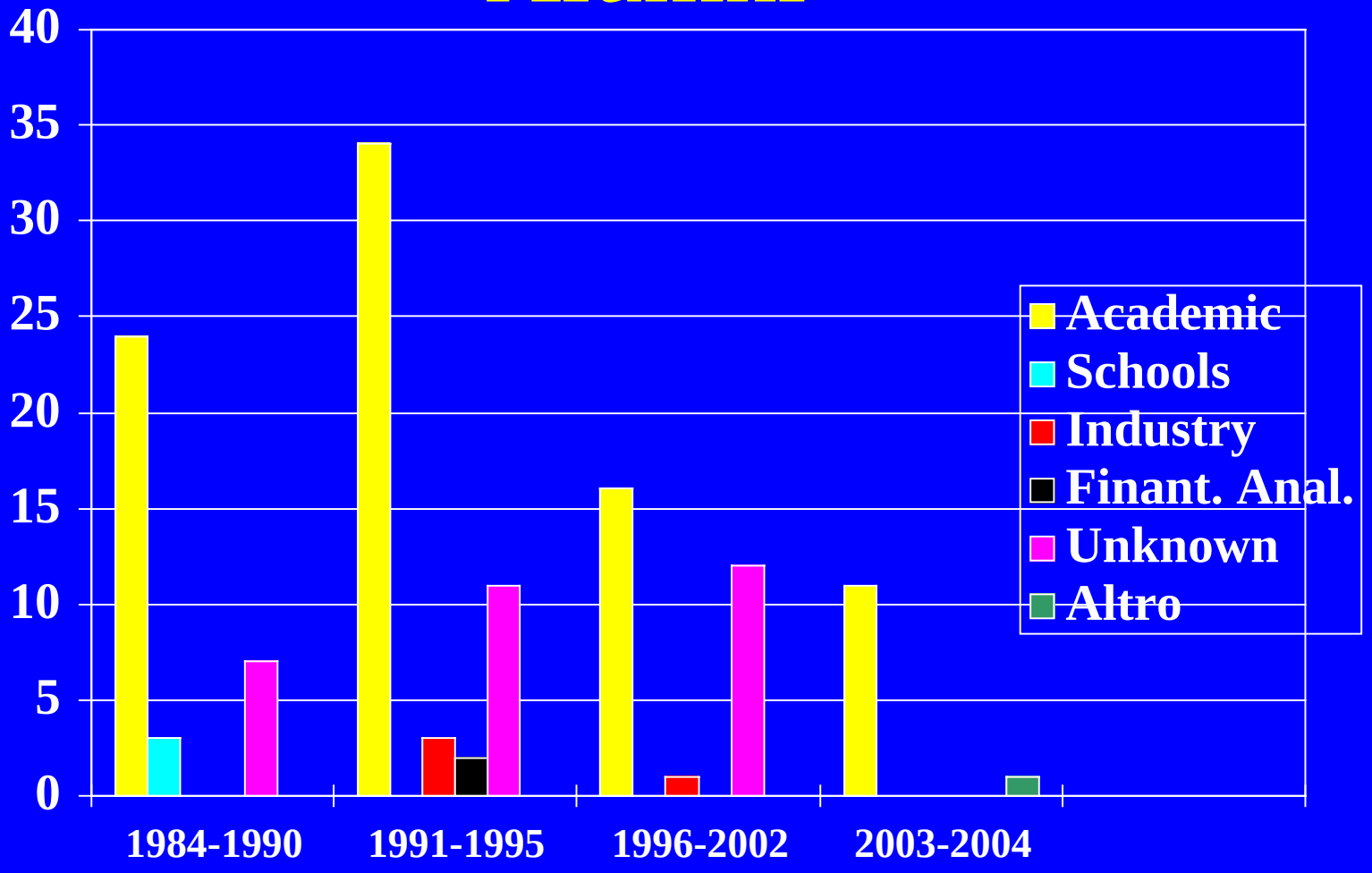
V. Medical Physics

The Medical Physics group started its pioneer work in late ’70, working on new devices for digital Imaging. Since then the group has grown stronger and stronger always devoting its efforts to the development of new detectors for applications in Medical Imaging. There is now a well established education and research program in medical physics both at undergraduate and post-graduate level. As in 2002 the Medical Physics group is composed of more than ten researchers, six of which are permanent staff.

Number of our Graduate Students

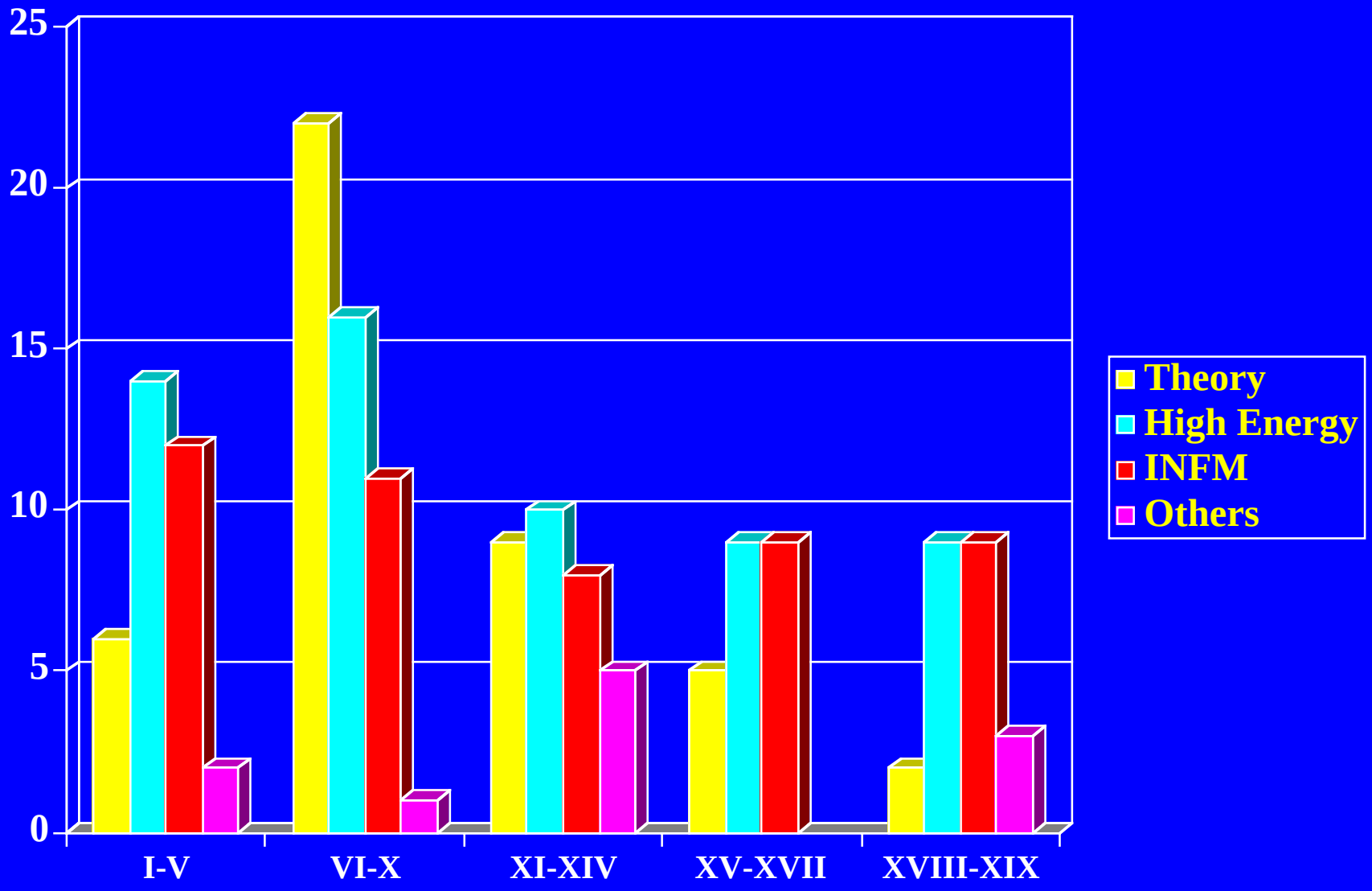


Alumni



Academic dominant includes Postdoc abroad and in Italy

Research Fields of Graduate Students



The Courses (40+40+40 basics+40 op.,with examination)

- Theoretical Physics (40 + 40 hrs)
  - Introduction to Quantum Field Theory and the Standard Model
- Condensed Matter Physics (40 + 40 hrs) - Physics of Many Body, Electron Interactions, Phonons, Superconductivity
- High-Energy Experimental Physics (40 + 40 hrs)
  - Physics of Colliders, Neutrinos, CP Violation

- Personal Program to be discussed with the Commission (Minguzzi, Batignani, Shore and Konishi) by 15 February

- Choice of supervisor / Research Topics for the Thesis work to be communicated to the Graduate Board by the END OF JULY 1st year

- A short pre-thesis on the progress of work at the end of the 2nd year and an oral presentation

Lectures 2005

Lectures (Jan. - July)

(1) Basic courses (40 hrs each)
Theoretical Physics (Vicari, DiGiacomo)
Condensed Matter Physics (Grosso)
Experimental H.E. Physics (Costantini)

- **Special topic courses (8 - 20hrs) (Also Master and SNS courses)**
  40 hrs obligatory

Seminars 2002-2004

"Sogno di una teoria finita", 07/11/02 (Veneziano)(Seminario di Dipartimento);
"Neutrinos", 20/02/03 (Murayama);
"Big world of small neutrinos", 21/02/03 (Murayama)(Seminario Galileiano);
"Bose-Einstein condensation", 07/03/03 (Arimondo)(Seminario Galileiano);
"Coldest Thing in the Universe", 28/03/03 (Phillips)(Colloquio Galileiano);
"Rottura della simmetria ED" 04/04/03 (Barbieri);
"L'intelligibilità dello spazio, il continuo e le teorie della conoscenza" 09/05/03 (Longo) (Colloquio Galileiano);
"La Fisica al Tevatron" 09/05/03 (Bellettini);
"Fisica ai Colliders con b-tagging", 23/05/03 (Dell'Orso);
"Dispositivi e macchine a livello molecolare,"09/06/03 (Balzani) (Colloquio Galileiano)
"Quantum Group Symmetries in Integrable Models", 19/09/03 (Jimbo) (Seminario Galileiano
"Molecular Alignment and Orientation in Strong Laser Fields", 9/10/03 (Van Leuven) (Seminario Galileiano)
"Supernovae in different stellar populations", 9/12/03 (Straniero)
"Supernove: modelli esplosivi e progenitori stellari", 10/12/03 (Straniero)
"QCD-like Gauge Dynamics from a Gravity Dual", 12/01/04 (Evans)
"Physics of active ion-doped II-VI materials for lasers and nonlinear optics", 20/02/04 (Sorokina)

“Il progetto di localizzazione satellitare Galileo. Navigare con satelliti e con orologi”, 12/03/04 (Leschiutta) (Seminario Galileiano)

“Elettronica per rivelatori” 17, 19 e 24/03/04 (Manfredi)

“Ricerca di assioni solari nell’esperimento CAST”, 24/03/04 (Di Lella)

“Il problema dei tempi di rilassamento nella Meccanica Statistica”, 6/5/04 (Giorgilli) (Seminario Galileiano)

"Theory of resonance interactions in ultracold quantum gases”, 12/05/04 (Holland)

“Fusione Nucleare: sorgente di energia e di problemi di ricerca di base. Incomprensioni, sprechi e progressi reali”, 20/05/04 (Coppi) (Colloquio Galileiano)

“Dynamic Systems with Symbolic Inputs”, 28/05/04 (Bicchi) (Seminario Galileiano)

“Solving problems with hardly a look at the data”, 21/06/04 (Muthukrishnan) (Seminario Galileiano)

“Controlling External Molecular Modes with Intense Light”, 6/07/04 (Seideman) (Colloquio Galileiano)

“Anagramma = Arma magna”, 17/11/04 (Peres), (Seminario Galileiano)

"Languages and Notations for Systems Biology”, 14/12/2004 (Cardelli) (Colloquio Galileiano)

CORSO DI DOTTORATO IN FISICA

NEW Ph D's - YEAR 2001

BARBIERI ANDREA - Relatore: E.Guadagnini
Titolo Tesi:.Su un approccio algebrico alla struttura microscopica dello spaziotempo"

BERTOLINI ALESSANDRO - Relatori: F.Fidecaro, R.De Salvo
Titolo Tesi: High sensitivity accelerometers for gravity experiments

BRUNETTI MAURA - Relatori: F.Pegoraro, F.Califano
Titolo Tesi:Nonlinear coherent structures in collisionless plasmas

DAMIANI CHIARA - Relatore: A.Del Guerra
Titolo Tesi: Experimental developments in dedicated scanners for positron emission tomography.

DI FALCO STEFANO - Relatore: F.Cervelli
Titolo Tesi: Study of neutral decays of K_L meson with Kloe detector

EMBRIACO DAVIDE - Relatore: G.La Rocca
Titolo Tesi: Self trapped excitation dynamics in luminescent organic aggregates

FAETTI MASSIMO - Relatore: M.Giordano
Titolo Tesi:Meccanismi di trasporto e processi di rilassamento in glass formers molecolari e polimerici

LELLI SIMONE - Relatore: M.Maggiore
Titolo Tesi: Teorie di gauge SU(N) e teorie duali di stringa

MARSILI PAOLO - Relatori F.Maccarrone, F.Strumia
Titolo Tesi: Scariche capillari in Argon, in regime continuo e impulsato

MONTINA ALBERTO - Relatori: E.Arimondo, Tito F.Arecchi
Titolo Tesi: Studio delle proprietà quantistiche di un condensato di Bose-Einstein

PAOLONI EUGENIO - Relatore: M.Giorgi
Titolo Tesi: Measurement of tau lifetime with the BaBar detector

RAMA MATTEO - Relatore: G.Batignani
Titolo Tesi: Measurement of the ratio BR (B ->DK)/BR(B ->DPi) with the BaBar detector

RISSONE ANNA - Relatore: M.Maggiore
Titolo Tesi: Dualità fra teorie di stringa e teorie di Yang-Mills non supersimmetriche

SIMI GABRIELE - Relatore: M.Giorgi
Titolo Tesi: Measurement of Dzero lifetime with the BaBar detector

CORSO DI DOTTORATO IN FISICA

NEW Ph D's - YEAR 2002

CASCIANO CLAUDIO - Relatore: A.Giazotto
Titolo Tesi:. SEISMIC ISOLATION FOR THE TEST MASSES OF THE VIRGO GRAVITATIONAL WAVE ANTENNA

CIAMPINI DONATELLA - Relatore: E.Arimondo
Titolo Tesi: REALIZATION OF A 87Rb BOSE-EINSTEIN CONDENSATE: ATOMIC PHYSICS WITH COHERENT MATTER WAVES

PALATELLA LUIGI - Relatore: M.Tonelli
Titolo Tesi: ENERGY TRANSFER IN RARE EARTH-DOPED CRYSTALS

PAPINUTTO MAURO - Relatori: G.Martinelli e S.Caracciolo
Titolo Tesi: NEW LATTICE APPROACHES TO NON-LEPTONIC KAON DECAYS

PRATI ENRICO - Relatore: M.Martinelli
Titolo Tesi: RESONANT METHODS FOR THE STUDY OF MICROWAVE FREQUENCY TRANSPORT IN SEMICONDUCTORS

SEGNERI GABRIELE - Relatore: G.Tonelli
Titolo Tesi: SCALAR TOP QUARK SEARCH AT LHC WITH THE CMS DETECTOR."

CORSO DI DOTTORATO IN FISICA

NEW Ph D's - YEAR 2003

CARATORI TONTINI FABIO - Relatori N.Beverini, O.Faggioni
Titolo Tesi: THE GAU SSIAN APPROXIMATION IN THE NUMERICAL INVERSION AND MODELLING OF GEOMAGNETIC DATA

CERVELLI FEDERICO - Relatore E.Arimondo
Titolo Tesi: LASER COOLED CESIUM ATOMIC BEAM FOR NANOLITHOGRAPHY EXPERIMENTS

GALIMBERTI MARCO - Relatore D.Giulietti
Titolo Tesi: ELECTRON TRAPPING AND ACCELERATION BY RELATIVISTIC LASER INTERACTIONS WITH UNDERDENSE PLASMAS

GATTI CLAUDIO - Relatore M.Incagli
Titolo Tesi: MEASUREMENT OF THE BRANCHING FRACTION FOR THE DECAY BR(KS->pi e nu) WITH THE KLOE DETECTOR

GUBINELLI MASSIMILIANO - Relatore S.Caracciolo
Titolo Tesi: FINITE-SIZE SCALING IN NON-EQUILIBRIUM CRITICAL PHENOMENA

PETRONI SILVIA - Relatori G.Bono, V.Castellani
Titolo Tesi: Classical Cepheid and RR Lyrae pulsation models: dependence on input physics and parameters

CORSO DI DOTTORATO IN FISICA

NEW Ph D's - YEAR 2004

12/01/04 - **APREDA RICCARDO - Relatori proff. M.Maggiore e A.Zaffaroni**
Titolo Tesi: "Gravity Duals of SUPERSymetric and non-supersymmetric gauge theory"

06/07/04 - **BERNARDINI JACOPO - Relatore prof. G.Tonelli**
Titolo Tesi: "Higgs Search in the Channel H---> WW--->lvjj with the CMS Detector"

23/04/04 - **PARRUCCINI PIETRO - Relatore prof. P.Rossi**
Titolo Tesi: "Critical properties of multiparameter Hamiltonians"

19/07/04 - **SANGUINETTI STEFANO - Relatori Proff.P.Jacquier e P.Minguzzi**
Titolo Tesi: "Atomic parity violation in heavy alkalis: detection by stimulated emission for cesium and traps for cold francium "

26/07/04 - **USAI GIULIO - Relatore prof. T.Del Prete**
Titolo Tesi: "Identification and triggering of soft muons in the Atlas detector"

20/12/04 - **CAMPOSEO ANDREA - Relatore prof. E.Arimondo**
Titolo Tesi: "Atom lithography wIth neutral atoms"

CORSO DI DOTTORATO IN FISICA

NEW Ph D's - YEAR 2005

14/01/05 - **ANNOVI ALBERTO - Relatori proff. M.Dell'Orso**
Titolo Tesi: "HADRON COLLIDER PHYSICS WITH REAL TIME TRAJECTORY RECONSTRUCTION "

14/01/05 - **BUCCI FRANCESCA - Relatore prof. M. Giorgi**
Titolo Tesi: "STUDY OF B TO X_S GAMMA WITH A FULLY INCLUSIVE TECHNIQUE AT BABAR"

14/01/05 - **SANDRELLI FRANCESCO - Relatore prof. M. Giorgi**
Titolo Tesi: "LIMITS ON THE DECAY-RATE DIFFERENCE OF NEUTRAL B MESON AND CP,T AND CPT VIOLATION IN B0 Bbar0 OSCILLATIONS AT BABAR EXPERIMENTS"

Dei 32 nuovi dottori di ricerca fisica (2001-2004),

17 sono assegnisti Universitari (di cui due sono contrattisti INFM/CNR) a Pisa
3 assegnisiti universitari fuori Pisa
6 postdoc all'estero
1 ricercatore univ. (Pisa)
2 industria
1 RIS (Carabinieri)
1 contratto INGV (Istituto Nazionale di Geologia e Vulcanologia)

Ph D Students in Graduate Course in Physics 2005 (5+2+2+1+1+2 = 13 scholarships)

Basile Francesco
Birindelli Simona
Blanchon Guillaume
Boschi Valerio
Faganello Matteo
Ghimenti Vanni
Michetti Paolo
Papa Angela
Staveris Thanasis
Tremola Ciro
Venditti Stefano
Zenesini Alessandro
Zerella Simone