Fisica Teorica all'INFN tra passato, presente e futuro

4 NOVEMBRE 2022, ORE 11:00

Aula A1-A2, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali
Sapienza Università di Roma
Via Caserta 6 - Roma

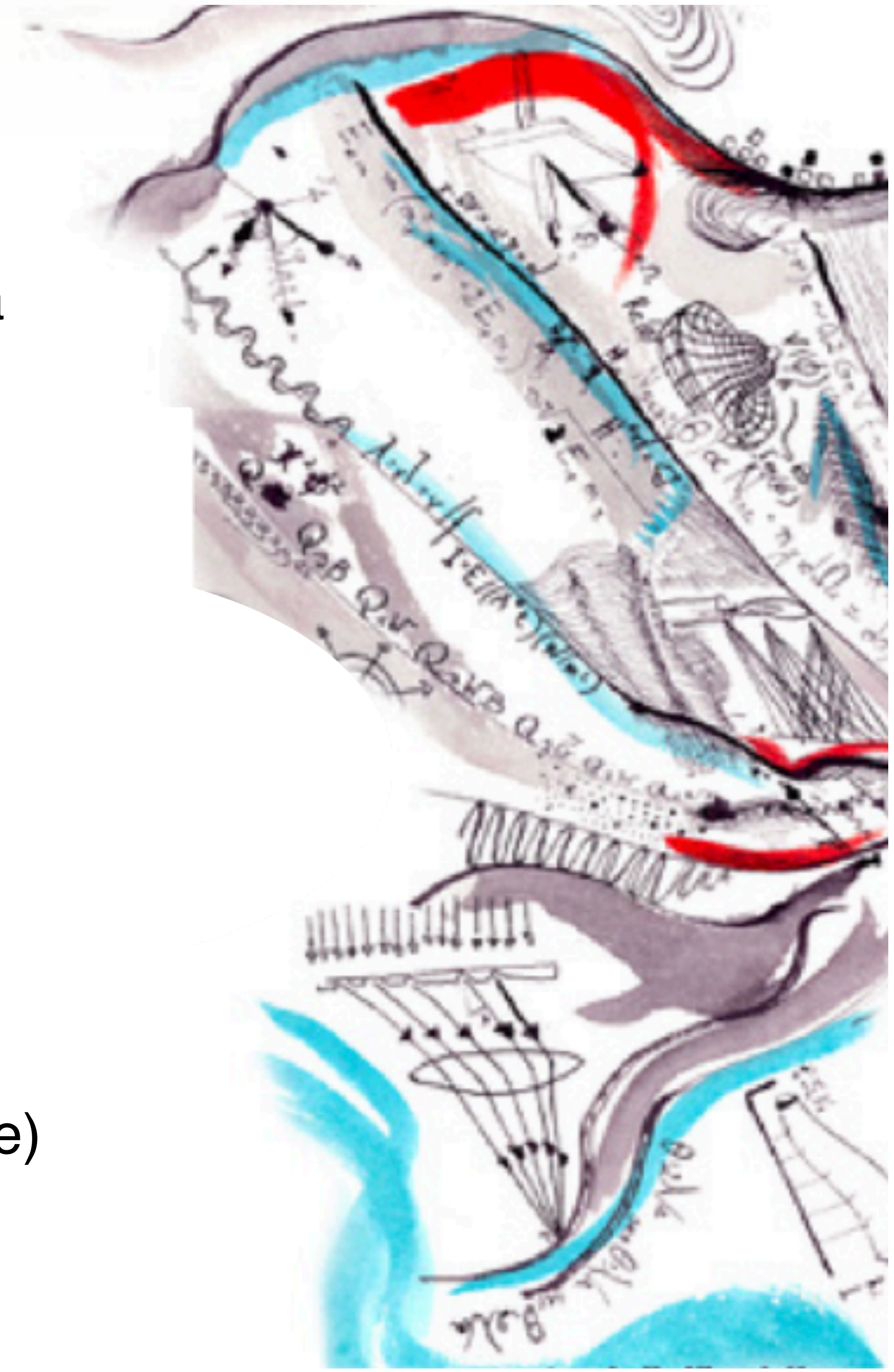
Comitato organizzatore:
C. M. Becchi, M. Ciuchini, S. De Curtis, A. Lerda, L. Maiani, G. Martinelli, F. Piccinini

Comitato organizzatore locale:
A. Nisati, L. Silvestrini

INFN

Le Scuole di Fisica Teorica
Stefania De Curtis

Le Scuole di Fisica Teorica INFN



Seminario Nazionale di Fisica Teorica di Parma

Spring School "Bruno Touschek" (Frascati)

Scuole del Galileo Galilei Institute (GGI)

International School of Subnuclear Physics (Erice)

Seminario Nazionale di Fisica Teorica
Università di Parma e INFN

Istituito nel **1991** si è svolto ogni anno fino al **2006** (principale promotore **Enrico Onofri**)
Organizzato su due settimane, la prima "generale" sul Modello Standard e la seconda più specialistica

L'idea era di dedicare una settimana a tutti i dottorandi teorici italiani (tipicamente) di area INFN e una di approfondimento su un tema specifico

Dal **2006** la scuola ha assunto la denominazione "**Parma International School of Theoretical Physics**" e si è aperta a studenti da tutto il mondo

Dal **2007** al **2016** è diventata di una settimana, su temi specifici

Comitato Scientifico: R. Barbieri, A. Bassetto, C. Becchi, Ph. de Forcrand, M. Ciafaloni, V.A. Fateev, F. Feruglio, F. Gliozzi, G. Isidori, L. Maiani, M. Mangano, G. Marchesini, A. Masiero, P. Menotti, E. Nicodemi, E. Onofri, R. Rattazzi, M. Staudacher, L. Rezzolla, G. Ridolfi, S. Sharpe, G. Veneziano.
Comitato Organizzatore Locale: G. Marchesini, E. Onofri, M. Bonini, F. Di Renzo, L. Superchi.

Nei suoi ~20 anni di vita, la Scuola di Parma ha avuto "grandi" speaker e anche molti "senior" che hanno partecipato da studenti

Storico dalla pagina web di Enrico Onofri

https://www.eoinfnpr.it/#Scuola_estiva_di_Fisica_Teorica_

Seminario Nazionale di Fisica Teorica

1997 - Campi Stringhe e Onde Gravitazionali

G. Curci	Pisa-I N F N	Rivelazione di Onde Gravitazionali con interferometri a Larga Banda (file ps.gz 2.4MB) (file pdf 4.5MB)
V. Ferrari	Univ. Roma "La Sapienza"	Teoria delle Onde Gravitazionali Bibliografia: 1 2 3 4
M. Gasperini	Univ. Torino	Cosmologia, inflazione e la teoria delle stringhe II.
D. Maison	Max-Planck-Inst. Munich	Gravitational Solitons and Black Holes
A. Masiero	Univ. Perugia - S I S S A	Indizi di nuova fisica da astrofisica e cosmologia
M. Porrati	N Y U	D-brane, M-teoria, F-teoria e risultati non perturbativi in teoria dei campi
G. Veneziano	C E R N	Cosmologia, inflazione e la teoria delle stringhe I
A. Vicere'	Pisa-I N F N	L'esperimento VIRGO (ps.gz, 1.5 MB)

Parma, 30 agosto - 10 settembre 1999

Progressi in teoria di stringa

Modello Standard e QCD	**Paolo Nason** (*Milano*)
Giovanni Ridolfi (*Genova*)	
Riccardo Barbieri (*SNS-Pisa*)	
Riccardo Rattazzi (*SNS-Pisa*)	
D-brane, Modello AntiDeSitter e CFT	**Pietro Fre** (*Torino*)
Alberto Lerda (*Torino*)	

Programma 2003

Modello Standard	
Guido Altarelli *CERN - Università di Roma Tre*	*Interazioni Elettrodeboli nel MS e oltre* - Lezioni: (PDF)
Giovanni Ridolfi *INFN - Genova*	*Introduzione alle teorie supersimmetriche* Lezioni: Ridolfi.pdf
Ferruccio Feruglio *Università di Padova*	*Masse dei neutrini e unificazione delle interazioni fondamentali*
Supersimmetria e Modelli Matriciali	
Gabriele Ferretti *Chalmers U. of Tech., Goteborg*	Large N limit and Supersymmetry *Lezioni (hep-th/0311066)*
Giovanni Cicuta *Università di Parma*	Lezioni: Matrici aleatorie
Ken Konishi *Università di Pisa*	*Dinamica non perturbativa in Teorie di Gauge con Supersimmetrie N=1 e N=2* Lezioni: (PDF-1) (PDF-2) (PDF-3)
Massimo Bianchi *Università di Roma Tor*	Lezioni: Rinormalizzazione olografica

Parma International School of Theoretical Physics

2007

New Physics at the LHC: from model building to event generation
(September 3-8)

- SM: G. Ridolfi (Genova), *Basics of the Standard Model*
- QCD: A. Banfi (Milano-Bicocca), *Basics of QCD*
- ME1: F. Maltoni (Louvain), *Matrix elements with Monte Carlo*
- ME2: F. Maltoni (Louvain), *MadEvent, a matrix element Monte Carlo (practical session)*
- SUSY: A. Romanino (SISSA), *Super symmetric extension of the Standard Model*
- MC: B. Webber (Cambridge), *Physics of Event Generators*
- LHC: G. Dissertori (ETH, Zurich), *LHC physics*
- BSM: R. Contino (CERN), *Beyond the Standard Model*

2010 - New trends in Cosmology, Particle Physics and Gauge-Gravity Duality

John McGreevy	(MIT)
Yaron Oz	(Tel-Aviv University)
Antonio Riotto	(INFN-Padova and CERN)
Neal Weiner	(NYU)
Alberto Zaffaroni	(Milano-Bicocca Univ.)

2012 - Scattering Amplitudes in QCD, Supersymmetric Gauge Theories and Supergravity

Tree-level scattering amplitudes in Yang-Mills theories and Supergravity
Higher-loop scattering amplitudes
Applications to QCD and particle phenomenology
Twistor methods, recursion relations, and unitarity-based methods
Integrability, scattering amplitudes and the Gauge-String Duality

2014

- Introduction to Lattice Gauge Theories - L. Del Debbio
- Numerical Methods for Lattice QCD - S. Schaefer
- A Lattice Approach to Heavy Flavor Physics and Precision tests of the SM - M. Della Morte
- QCD Thermodynamics - O. Philpsen
- Graphene, topological insulator and Weyl semi-metals - P. Buidovich

2016

- Introduction to Resurgence and semiclassical physics - G. Donne
- Resurgence in gauge theories and sigma models -A,. Sherman
- Renormalons and OPE - A. Pineda
- ……

Frascati Spring School "Bruno Touschek"
in Nuclear, Subnuclear and Astroparticle Physics

First edition in 1996 (G. Pancheri)

Starting with **14th** edition in 2009 (E. Nardi) the format includes experimental lectures matching the same topics of the theoretical lectures.
(**Intended for PhD. students in both Th. & Exp. physics**).

The LNF Spring School also includes the

Young Researchers Workshop "Physics Challenges in the LHC Era"

Proceedings of the Workshop published in: *Frascati Physics Series.*
Writeup of the talk are often the first *arXiv* submission for the Spring School students.

20th edition in 2022 (G. Corcella): 1st PostCovid: 31 students (10 italian, 21 international, 11 women)

The Galileo Galilei Institute for theoretical physics (GGI)

5 PhD Winter Schools

Advanced Lectures in Fields and Strings
Lectures on the theory of fundamental interactions
Lectures on Statistical Field Theory
Frontiers in Nuclear and Hadronic Physics
Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation

The GGI History

- The Galileo Galilei Institute (GGI) è stato il primo Istituto Europeo dedicato alla Fisica Teorica. Nel 2004 Giuseppe Marchesini, il Presidente della CSN4 dell'Istituto Nazionale di Fisica Nucleare (INFN) appoggia la proposta di alcuni fisici fiorentini di utilizzare una parte della sede del Dipartimento di Fisica per ospitare workshop di 2-3 mesi

- A seguito di un accordo tra Università degli Studi di Firenze e INFN, il GGI nasce ufficialmente nel Settembre 2005 con una conferenza inaugurale a cui partecipano scienziati di alto livello internazionale

Inaugural Conference September 19-21 2005

- Nel 2006 il primo workshop ”New Directions Beyond the Standard Model in Field and String Theories”. Ad oggi, GGI ha organizzato 47 long-term workshops che hanno visto la partecipazione dei maggiori esperti a livello internazionale

- Nel 2008 nasce la scuola LACES (Lezioni avanzate di Campi e Stringa) organizzata da: Carlo Angelantonj, Pietro Antonio Grassi, Gianluca Grignani, Luca Griguolo, Domenico Seminara

"The aim of the school is to bring together PhD students with interests in Gauge and String Theory, and help them building a solid and specialised background on recent developments in Theoretical Physics."

- Caratteristica distintiva della scuola: lezioni alla lavagna, uffici per gli studenti, immersione totale per 3 settimane in un ambiente informale e stimolante

- Visto il successo di LACES, nel 2014, Alberto Lerda, allora Presidente della CSN4, propone che si allarghi lo spettro degli argomenti di fisica teorica trattati dalla scuole al GGI e vengono finanziate 4 scuole:

  - LACES (Lezioni Avanzate di Campi e Stringhe) - 3 settimane
  - GGI Lectures on the Theory of Fundamental Interactions - 3 settimane
  - Lectures on Statistical Field Theories - 2 settimane
  - Frontiers in Nuclear and Hadronic Physics - 2 settimane

  e, a partire dal 2019, si aggiunge la 5a scuola

  - Theoretical aspects of Astroparticle Physics, Cosmology and Gravitation - 2 settimane

- ~ 3 mesi dedicati alla alta formazione danno un nuovo ruolo al GGI e pongono le basi per la sua promozione a Centro Nazionale INFN di Sudi Avanzati, finalizzata nel 2018

- Più di 250 studenti partecipano alle scuole del GGI ogni anno
  Il training di alta qualità è riconosciuto a livello internazionale
  Ulteriore caratteristica distintiva delle scuole al GGI è la disponibilità delle video-registrazioni di tutte le lezioni (a partire dal 2013). Un archivio di grandissimo valore

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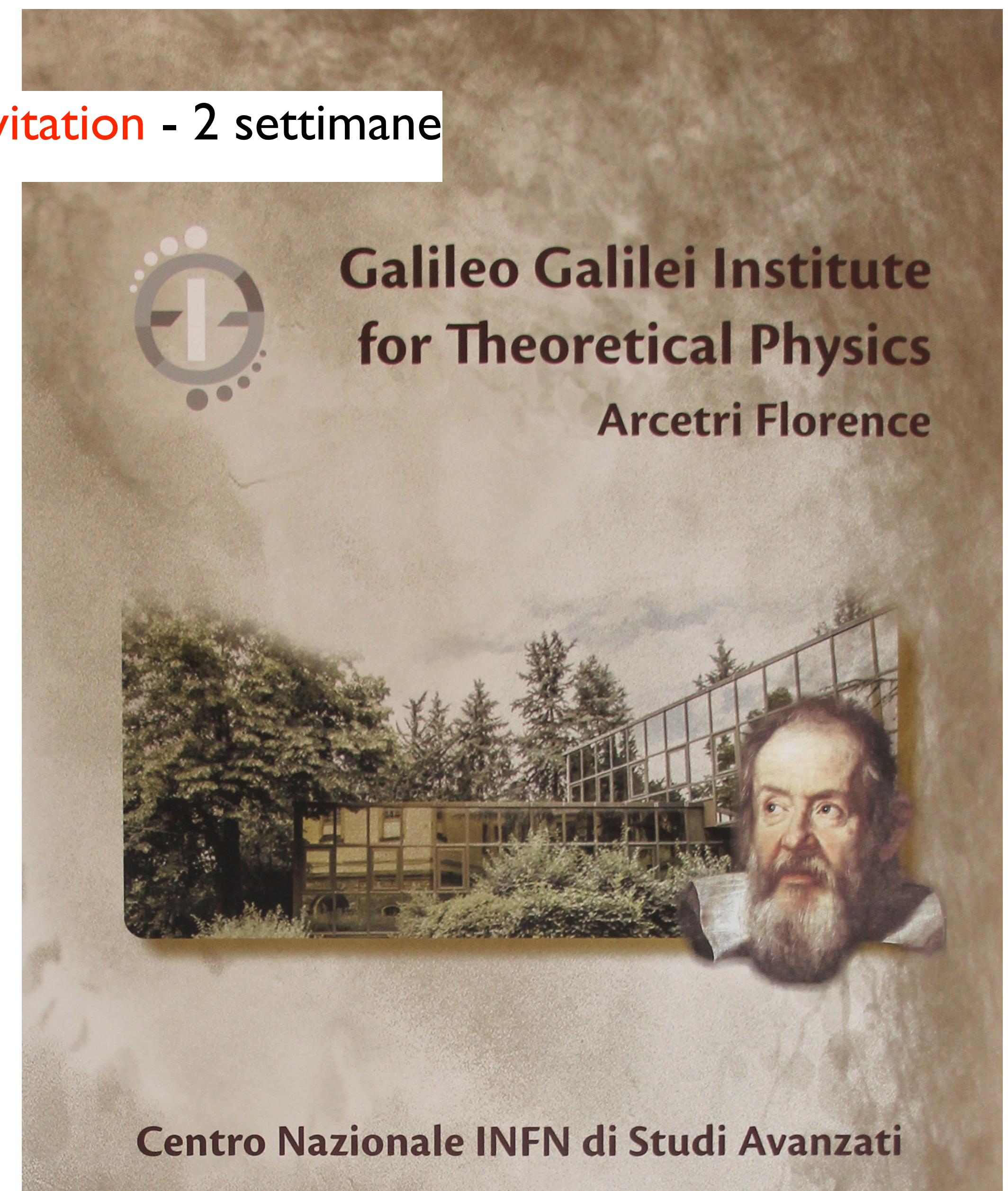

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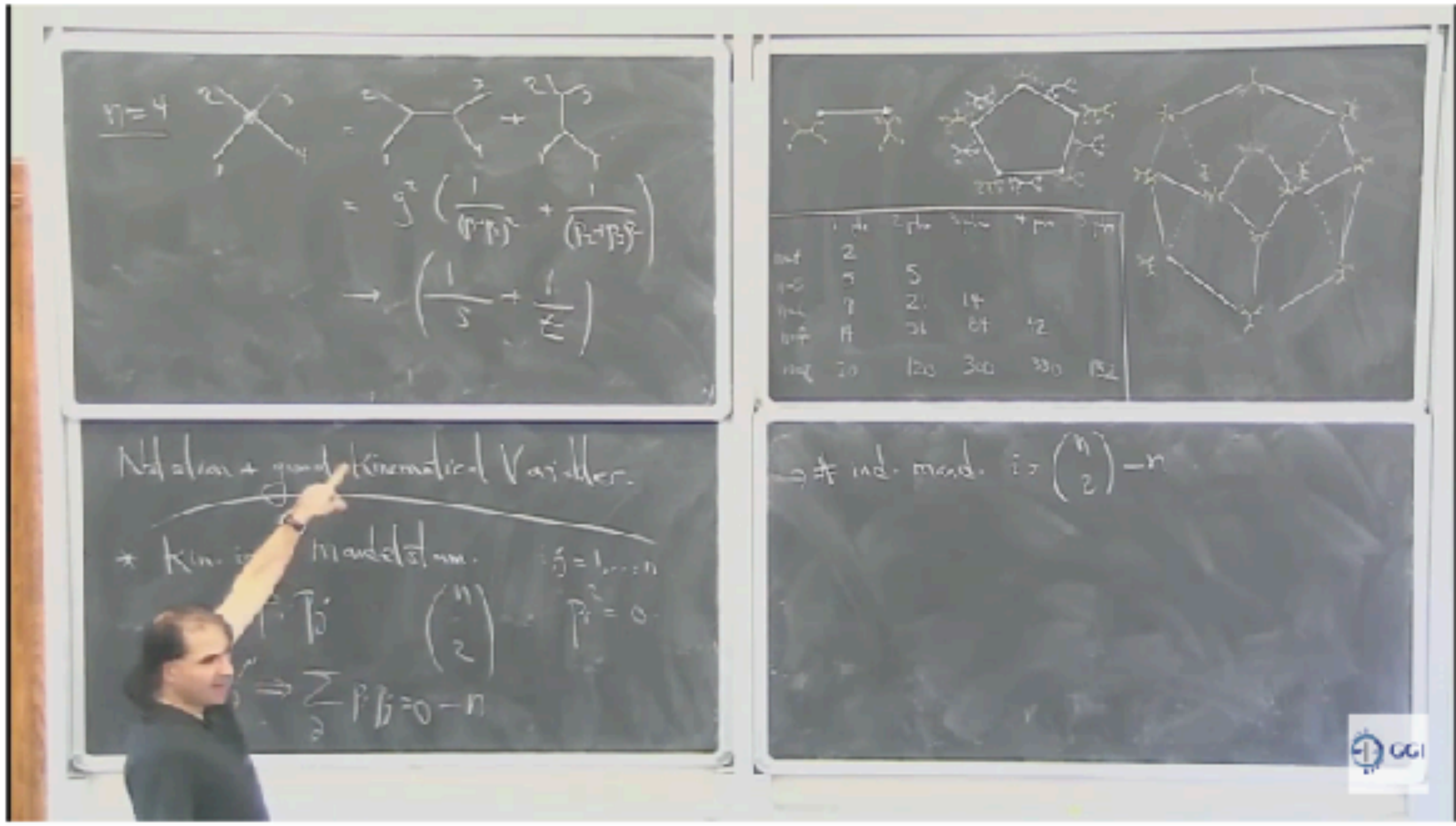


Positive Geometry of the Real World

N. Arkani-Hamed: Lecture I

Galileo Galilei Institute (...

2.38K subscribers

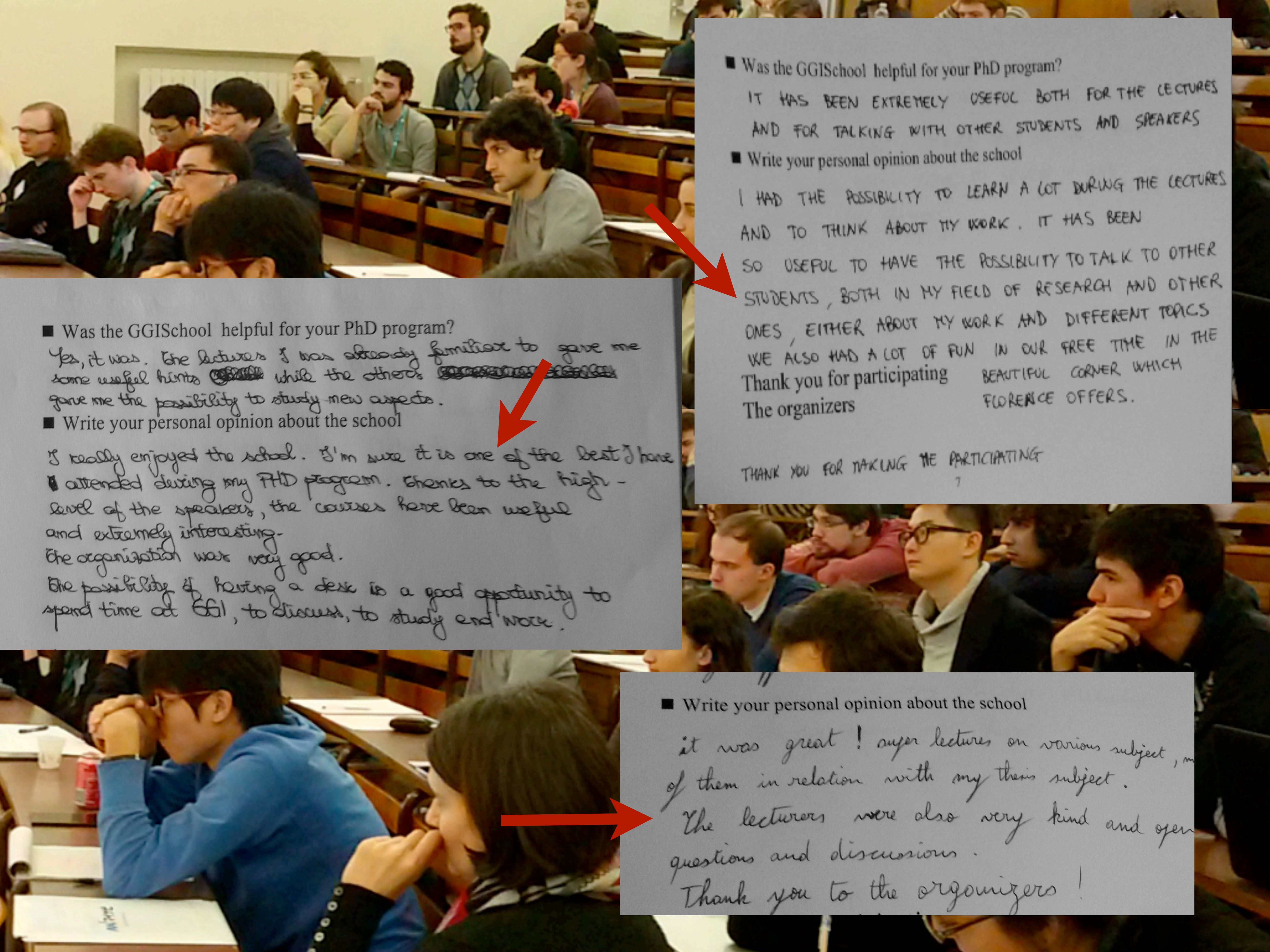
Subscribe

3.7K views 2 years ago

Talks given on january 21, 2020 at GGI.

"Positive Geometry of the Real World" Show more

GGI Lectures on the Theory of Fundamental Interactions 2015



■ Was the GGISchool helpful for your PhD program?

Yes, it was. The lectures I was already familiar to gave me some useful hints while the others gave me the possibility to study new aspects.

■ Write your personal opinion about the school

I really enjoyed the school. I'm sure it is one of the best I have attended during my PHD program. Thanks to the high-level of the speakers, the courses have been useful and extremely interesting.
The organization was very good.
The possibility of having a desk is a good opportunity to spend time at GGI, to discuss, to study and work.

■ Was the GGISchool helpful for your PhD program?

IT HAS BEEN EXTREMELY USEFUL BOTH FOR THE LECTURES AND FOR TALKING WITH OTHER STUDENTS AND SPEAKERS

■ Write your personal opinion about the school

I HAD THE POSSIBILITY TO LEARN A LOT DURING THE LECTURES AND TO THINK ABOUT MY WORK. IT HAS BEEN SO USEFUL TO HAVE THE POSSIBILITY TO TALK TO OTHER STUDENTS, BOTH IN MY FIELD OF RESEARCH AND OTHER ONES, EITHER ABOUT MY WORK AND DIFFERENT TOPICS
WE ALSO HAD A LOT OF FUN IN OUR FREE TIME IN THE BEAUTIFUL CORNER WHICH FLORENCE OFFERS.

Thank you for participating
The organizers

THANK YOU FOR MAKING ME PARTICIPATING

■ Write your personal opinion about the school

it was great! super lectures on various subject, m
of them in relation with my thesis subject.
The lecturers were also very kind and open
questions and discussions.
Thank you to the organizers!

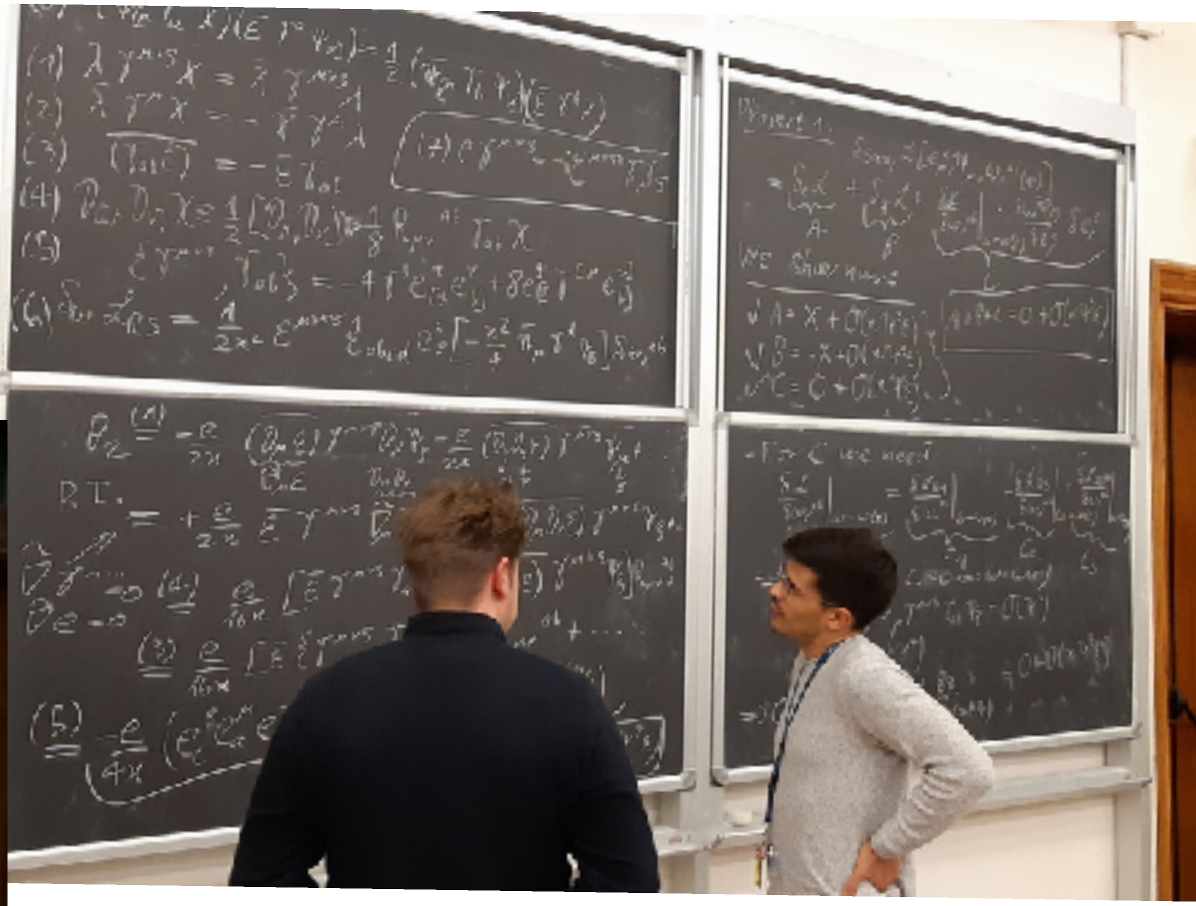
Frontiers in Nuclear and Hadronic Physics

School

Arcetri, Florence, February 22 – March 4, 2016

Theoretical
Aspects of
Astroparticle
Cosmology and
Gravitation
2019

LACES 2019



GGI Lectures on the Theory of Fundamental Interactions

Frontiers Nuclear and Hadronic Physics

Feb. 24 - Mar. 6 2020

GGI SCHOOL

LACES 2021

Lezioni Avanzate di Campi E Stringhe

Galileo Galilei Institute for Theoretical Physics, Arcetri Italy
November, 29th - December, 17th

Lectures

Supersymmetric Quantum Field Theories
Nikolay Bobev - KU Leuven

Advanced General Relativity
Monica Guica - IPhT Saclay

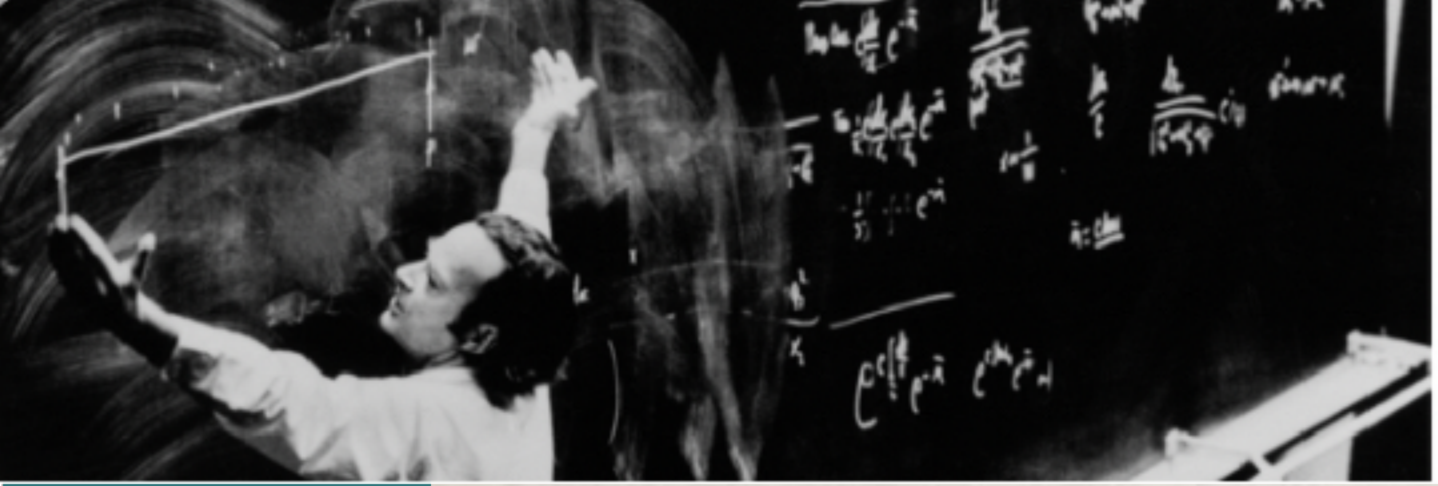
Supergravity at work
Gianguido Dall'Agata - University of Padova

Conformal Field Theory and Defects
Chris Herzog - King's College London

Superstring Perturbation Theory
Ashoke Sen - HBNI, Mumbai

Organisers:
Alice Bernamonti
Agnese Bissi
Davide Cassani
Carlo Maccaferri
Noppadol Mekareeya

~ 40 students in-person + 30 on-line
(34+6)
62.5% Italian



GGI LECTURES ON THE THEORY OF FUNDAMENTAL INTERACTIONS

Galileo Galilei Institute for Theoretical Physics
Firenze

10-28 JANUARY 2022

GGI SCHOOL

~90 on-line

Lecturers and topics

Sebastien DESCOTES-GENON (Orsay)
Flavor Physics

Gia DVALI (Munich U. & MPI Munich)
Beyond the Standard Model

Daniel FIGUEROA (IFIC & Valencia U.)
Gravitational Wave Backgrounds

Yonit HOCHBERG (Hebrew U.)
Dark Matter: New Directions for Theory and Experiment

Simone MARZANI (Genova U.)
QCD and Collider Physics

Alexander ZHIBOEDOV (CERN)
The Analytic S-matrix

Organizers

FRANCESCO D'ERAMO (Padova U. & INFN)
FABIO MALTONI (Bologna U. & Louvain U.)
GIULIANO PANICO (Firenze U. & INFN)
DIEGO REDIGOLO (INFN, Firenze & CERN)
GIULIA RICCIARDI (Napoli Federico II U. & INFN)
FRANCESCO RIVA (Geneva U.)

GGI SCHOOL

WINTER PHD SCHOOL ON

STATISTICAL FIELD THEORIES

The Galileo Galilei Institute for Theoretical Physics
Arcetri, Firenze

February 7-18, 2022

Lecturers

Mari Carmen Banuls *(Max Planck Institute of Quantum Optics, Garching):* "Introduction to tensor networks"

Nigel Cooper *(University of Cambridge):* "Quantum dynamics and topology"

Valentina Ros *(Université de Paris-Saclay):* "Localization in many-body quantum systems"

Subir Sachdev *(Harvard University):* "The quantum phases of matter"

Kareljan Schoutens *(University of Amsterdam):* "Many-body physics and quantum computation"

~100 on-line

Organizers:
P.Calabrese, J. Dubail, F.Essler, C.Morais-Smith, A. Trombettoni, J. Viti

GGI SCHOOL

FNHP2022
FRONTIERS IN NUCLEAR AND HADRONIC PHYSICS

School of the Galileo Galilei Institute for Theoretical Physics
Florence, February 21 - March 4, 2022

~90 on-line

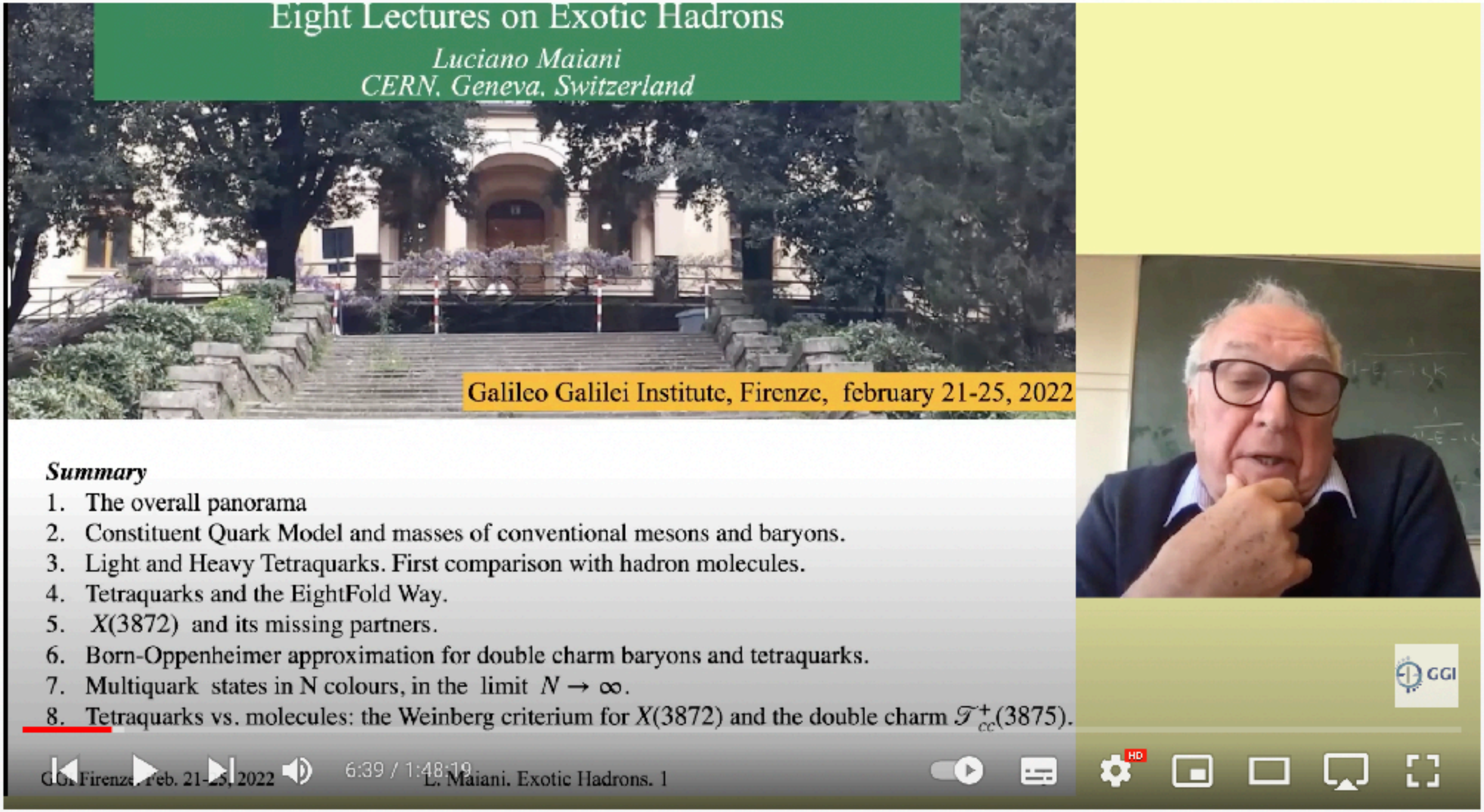
The 2022 edition will provide a pedagogical introduction to the basic concepts and tools needed for carrying out research in Hadron Exotic Spectroscopy and Deep Inelastic Scattering Phenomenology, covering the foundations of the subject at a deep and advanced level. The overlap of Hadronic Physics with dark matter search and with the physics of compact stars will be also explored. Special attention will be devoted to the current and future experimental efforts at both hadronic and electromagnetic facilities.

ORGANIZERS

Andrea Beraudo (INFN Torino)
Ignazio Bombaci (Pisa Univ. & INFN)
Angela Bonaccorso (INFN Pisa)
Maria Colonna (INFN LNS)
Vincenzo Greco (Catania Univ. & INFN)
Elena Santopinto (INFN Genova)
Sergio Scopetta (Perugia Univ. & INFN)
Enrico Vigezzi (INFN Milano)

LECTURERS

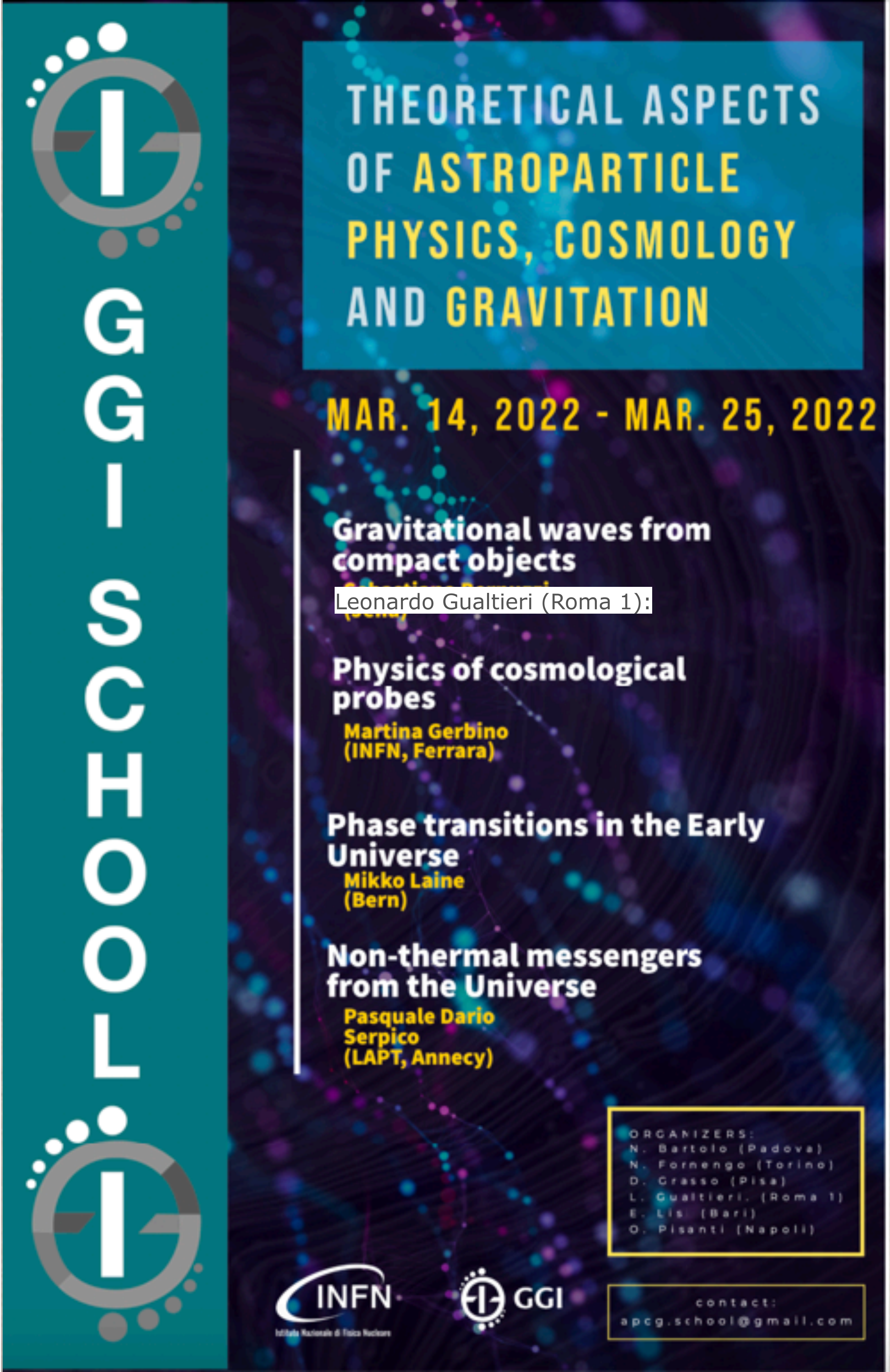
MARKUS DIEHL (DESY): *Nucleon partonic structure: concepts and measurements*
LUCIANO MAIANI (La Sapienza U.): *Physics of multiquark states*
BARBARA PASQUINI (Pavia U.): *Exploring the multidimensional structure of the nucleon*
ANDREAS RINGWALD (DESY): *Axions as dark matter candidates*
LAURA TOLOS (ICE, Barcelona): *Strangeness in hadron collisions, spectroscopy and neutron stars*



GGI Lectures on Exotic Hadrons

Luciano Maiani[1,*] and Alessandro Pilloni[2,3,†]

published on the GGI webpage



40 (33+7) students in person + on-line

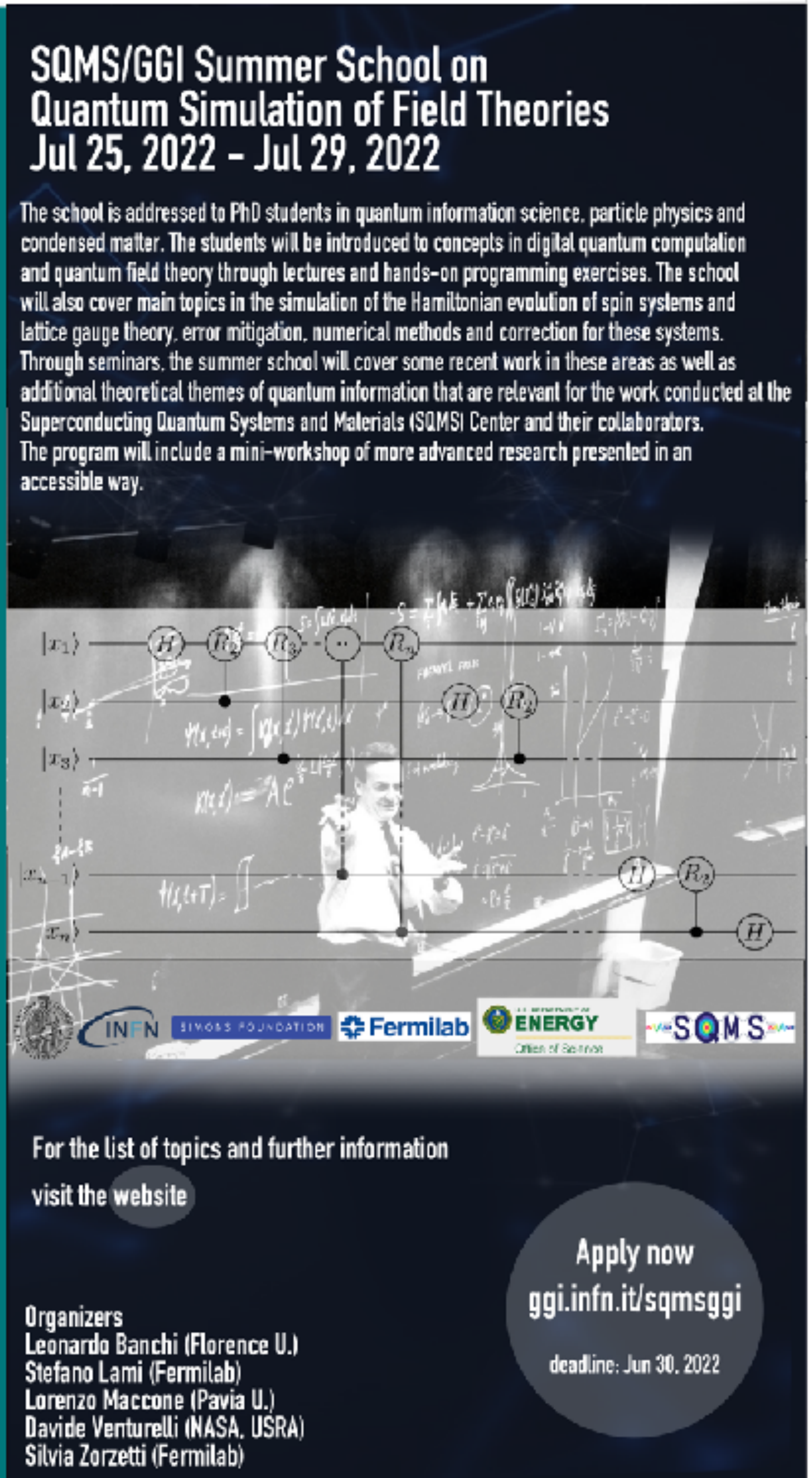
57.5% italian

"it was a pleasure to me to attend your school, it might have been the best 12 days in the last 2 years to me"

"La struttura su due settimane è utile ad avere uno stacco grazie al weekend, in modo da riprendere più freschi il lunedì della seconda settimana (ed è anche utile per poter visitare la meravigliosa città di Firenze)"

Maybe it is possible to make some **poster/talk sessions** where interested students can present a general overview of their work and discuss ideas

Le norme anti-Covid **hanno funzionato bene**, anche se era un peccato non poter pranzare a gruppetti



in collaboration with the U.S. Department of Energy, Office of Science, National Quantum Information Science Research Centers, Superconducting Quantum Materials and Systems Center (SQMS).

3 fellowships for students from USA

~ 35 students in person (30% italian) + ~ 35 on-line participants

This school is **one of the milestones** of the SQMS-INFN program

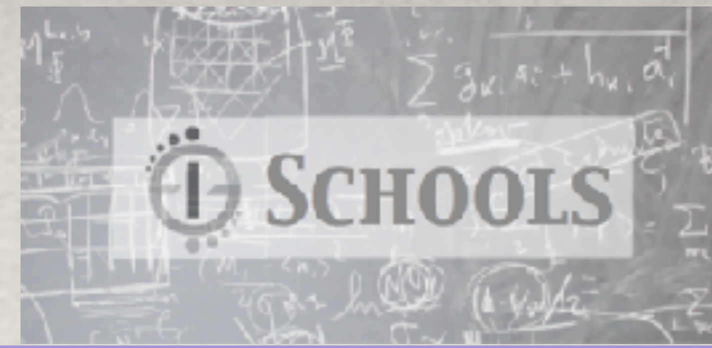
← Tweet

SQMS Center
@sqmscenter

SQMS/GGI Summer School on Quantum Simulation of Field Theories co-organized by @INFN_ and SQMS
The school hosted 35 students in-person and 35 virtually, with a focus on quantum algorithms
Lecturers from @Fermilab, @NASAAmes, @AmesNatLab, @unitaryfund, @CERN, @ORNL, @UNI_FIRENZE

Scuole di Dottorato al GGI

Attività 2022/2023



All the lectures are video-recorded → Galileo Galilei Institute (GGI) - YouTube

☑ **LACES 2022** (28 Nov - 16 Dic 2022)

organizzatori:

A. Bernamonti (Univ. of Florence), A. Bissi (Uppsala U.), D. Cassani (INFN, Padova), C. Maccaferri (Univ. of Torino), N. Makareeya (Univ. of Milano Bicocca)

☑ **GGI Lectures on the Theory of Fundamental Interactions 2023** (9-27 Jan 2023)

organizzatori:

F. D'Eramo (Univ. Padova), R.Franceschini (Roma3 U. & INFN), G. Panico (Florence U. & INFN), D. Redigolo (CERN & INFN FI), G. Ricciardi (Napoli U. & INFN), F. Riva (Geneve U.)

☑ **SFT 2023 - Lectures on Statistical Field Theory** (6-17 Feb 2023)

organizzatori:

P. Calabrese *(SISSA, Trieste)*, J. Dubail (Lorraine U. Nancy), F. Essler (University of Oxford), C.Morais-Smith (University of Utrecht), A. Trombettoni *(Univ. Trieste)*, J. Viti

☑ **Frontiers in Nuclear and Hadronic Physics** (27 Feb - 10 Mar 2023)

organizzatori:

A.Beraudo (INFN, Torino), I. Bombaci (Univ. &INFN, Pisa), A. Bonaccorso (INFN, Pisa), M. Colonna (LNS-INFN, Catania), V.Greco (Univ. & LNS-INFN, Catania), S. Scopetta (Univ. & INFN, Perugia), E. Santopinto (INFN, Genova), E. Vigezzi (INFN, Milano)

☑ **Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation** (20-31 Mar 2023)

organizzatori:

N. Bartolo (Padova), N. Fornengo (Torino), D. Grasso (Pisa), L. Gualtieri (Roma 1), E. Lisi (Bari), G. Miele (Napoli)

ETTORE MAJORANA FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES

INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS since 1963

1964

PHENOMENOLOGY OF RESONANCES

(Dalitz plots, methods of assigning spin and parities, etc.)

N. Cabibbo, Lawrence Radiation Laboratory, Berkeley, California, U.S.A.

1975

OPENING LECTURE

« *Quarks from Paradox to Myth* ».
K. G. WILSON, Cornell University, Ithaca, N.Y., U.S.A.

THEORETICAL LECTURES

« *Mass Spectra, Coupling Constants and other Intrinsic Properties of the Charmed Particles* ».
L. MAIANI, Istituto Superiore di Sanità, Rome, Italy.

1981

THEORETICAL LECTURES

Monopoles revisited
• S. COLEMAN, Harvard University, Cambridge, Mass., USA

Numerical studies of gauge field theories
• M.J. CREUTZ, Brookhaven National Lab., Upton, NY, USA

Lepton structure
• S.D. DRELL, SLAC, Stanford, Calif., USA

What can we learn from the next generation of experiments?
• G. ROSS, University of Oxford, Oxford, UK

Unification without fundamental scalars
• L. SUSSKIND, Stanford University, Stanford, Calif., USA

Unification and cosmology
• F. WILCZEK, University of California, Santa Barbara, USA

New ideas in neutrino physics
• E. WITTEN, Princeton University, Princeton, NJ, USA

Unification and dimensional reduction
• E. WITTEN, Princeton University, Princeton, NJ, USA

1969

THEORETICAL LECTURES

« *Algebraic methods in Particle Physics* » (*Current and Field Algebra, Sum Rules, Symmetry Groups*).
S. WEINBERG, Massachusetts Institute of Technology, Cambridge, U.S.A.

1982

THEORETICAL LECTURES

Foundations of gauge theories and present status
• C.N. YANG, SUNY, Stony Brook, NY, USA

Supersymmetry and unification of particle interactions
• S. FERRARA, CERN, Geneva, Switzerland

Experimental implications of g...
• D. NANOPOULOS, CERN

1996

Effective Descriptions of Physics Beyond the Standard Model
• R. BARBIERI, University of Pisa, I

Effective Actions and Confinement in Supersymmetric Theories
• N. SEIBERG, Rutgers University, Piscataway, NJ, USA

Cosmological Vacua from the Effective String Theory
• G. VENEZIANO, CERN, Geneva, CH

1989

THEORETICAL LECTURES

The Cosmological Constant Problem
• A. STROMINGER, University of California, Santa Barbara,

The Spin of the Quarks Inside the Proton
• G. ALTARELLI, CERN, Geneva, CH

«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES

INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS

Directors of the School: A. ZICHICHI, A. ZOCCOLI

GRAVITY AND MATTER IN THE SUBNUCLEAR WORLD

58th Course – ERICE-SICILY: 15 – 24 JUNE 2022

INFN

Sponsored by the: · Italian Ministry of Education, University and Scientific Research · Sicilian Regional Government · Academies of Sciences of Estonia, Georgia, Lithuania, Russia and Ukraine · Chinese Academy of Sciences · Commission of the European Communities · European Physical Society · Italian National Institute for Nuclear Physics · Weizmann Institute of Science · World Federation of Scientists · World Laboratory

CO-DIRECTORS of the Course: G. 't HOOFT - A. ZOCCOLI

PROGRAMME AND LECTURERS

OPENING LECTURE

Fundamental quantum mechanics, quantum gravity and black holes, how our understanding is improving
- G. 't HOOFT, Utrecht University, Utrecht, NL

THEORY, PHENOMENOLOGY & EXPERIMENTS

Observing the universe through gravitational waves: What are we learning?
- G. CELLA, INFN, Pisa, IT

Status and perspectives of direct detection of dark matter
- M. LINDNER, Max Planck Institute for Nuclear Physics, Heidelberg, DE

Axions in particle physics and cosmology
"Invisible" axion search methods
- P. SIKIVIE, University of Florida, Gainesville, FL, US

What does cosmology tell us about neutrinos?
- L. VERDE, Instituto de Ciencias del Cosmos (ICC), UB-IEEC, Facultad de Fisica, Barcelona, ES; ICREA, Universitat de Barcelona, Barcelona, ES

Status of neutrino masses, oscillations and mixing
- M.C. GONZÁLEZ-GARCÍA, C.N. Yang Institute for Theoretical Physics, Stony Brook University, Stony Brook, NY, US; ICREA, Universitat de Barcelona, Barcelona, ES

Are neutrino and antineutrino the same particle?
- A. BETTINI, INFN & Padua University, Padua, IT

What is the origin of the extreme high energy cosmic rays?
- G. MORLINO, INAF, Florence, IT

The challenge of g minus 2
- L. LELLOUCH, Centre de Physique Théorique, CNRS–Luminy, Marseille, FR

High T QCD plasma and QCD Phase diagram
- M. STEPHANOV, University of Illinois, Chicago, IL, US

Probing dense matter with neutron star mergers
- M.G. ALFORD, Washington University, Saint Louis, MO, US

LHC and perturbative QCD
- E. LAENEN, NIKHEF, Amsterdam, NL

The present status of the Standard Model with some focus on Steven Weinberg's contributions
- J.R. ELLIS, CERN, Geneva, CH

HIGHLIGHTS

ATLAS and CMS
- M. COBAL, Udine University, Udine, IT

LHCb
- M. PEPE ALTARELLI, CERN, Geneva, CH

ALICE
- L. MUSA, CERN, Geneva, CH

BNL and RHIC
- L. RUAN, Brookhaven National Laboratory, Upton, NY, US

GRAN SASSO
- A. ZOCCOLI, INFN, Rome, IT

ICCR
- Y. KOSHIO, Okayama University, Okayama, JP

Ice Cube
- F. HALZEN, University of Wisconsin-Madison, WI, US

FAIR
- P. GIUBELLINO, GSI and FAIR, Institute für Theoretische Physik, Darmstadt, DE

CLOSING LECTURE

The New Manhattan Project
- A. ZICHICHI, CERN, Geneva, CH; University of Bologna & INFN, IT

«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES

INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS

Directors of the School: A. ZICHICHI, A. ZOCCOLI

GRAVITY AND MATTER IN THE SUBNUCLEAR WORLD

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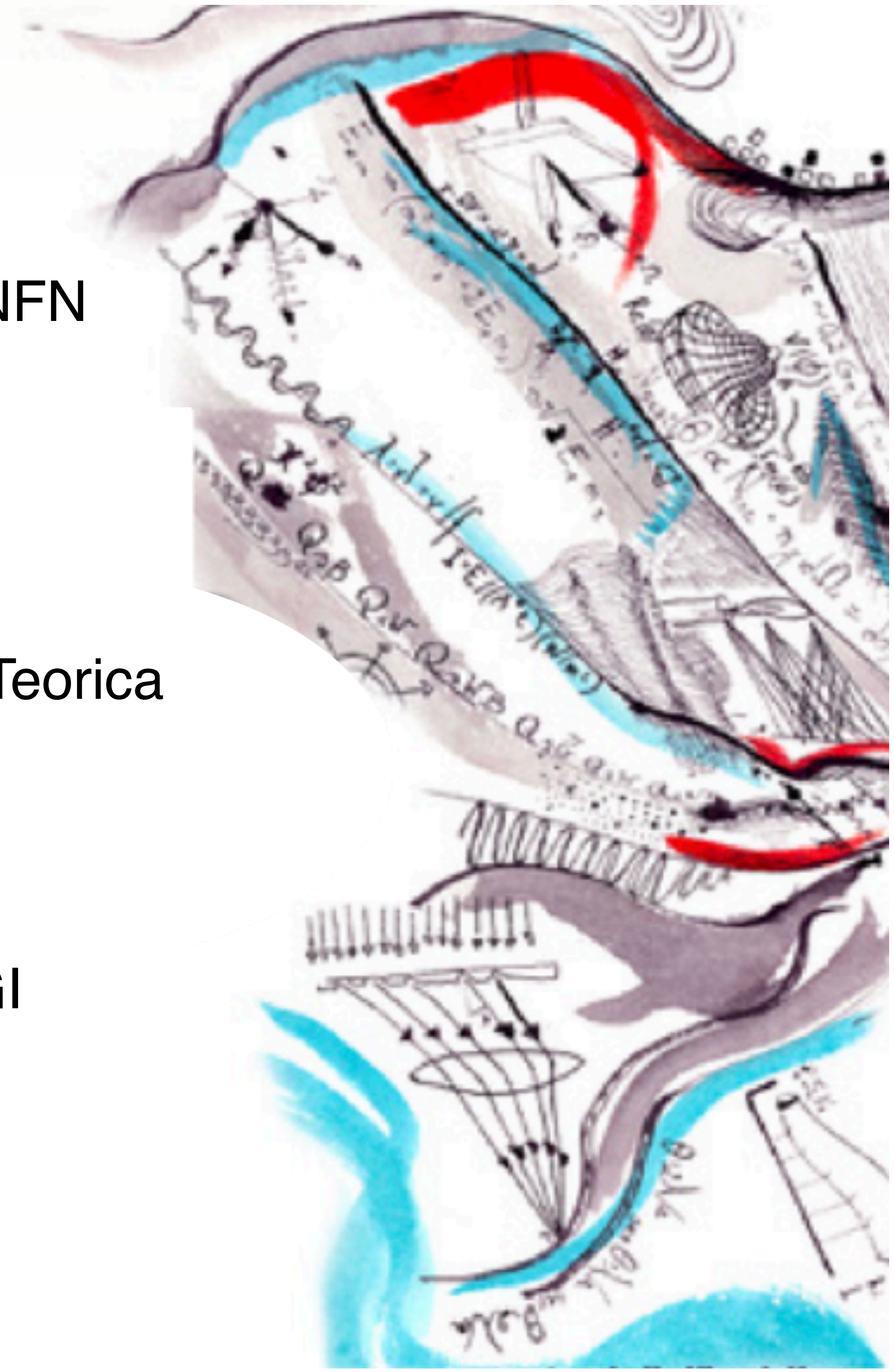
59th Course

14 - 23 June 2023

Importante contributo INFN alla formazione in Fisica Teorica



Convenzione con le Università per borse di Dottorato INFN non vincolate a progetti specifici

Organizzazione di Scuole di Fisica Teorica

Assegni di ricerca per neo-dottori in fisica teorica al GGI