

PROGRAM



Monday morning, July 13th

La Sapienza Roma - Aula Magna

09:00 - 10:00

Inaugural Session

Chairperson: Paolo de Bernardis

Welcoming addresses

Remo Ruffini (ICRANet), Yvonne Choquet-Bruhat (French Académie des Sciences),
Jose' Funes (Vatican City), Ricardo Neiva Tavares (Ambassador of Brazil),
Sargis Ghazaryan (Ambassador of Armenia), Francis Everitt (Stanford University)
and Chris Fryer (University of Arizona)

Marcel Grossmann Awards

Yakov Sinai, Martin Rees, Sachiko Tsuruta, Ken'ichi Nomoto,
ESA (acceptance speech by Johann-Dietrich Woerner, ESA Director General)

Lectiones Magistrales

- 10:00 - 10:35 **Yakov Sinai** (Princeton University)
Deterministic chaos
- 10:35 - 11:10 **Martin Rees** (University of Cambridge)
How our understanding of cosmology and black holes has been
revolutionised since the 1960s
- 11:10 - 11:35 **Group Picture - Coffee Break**
- 11:35 - 12:10 **Gerard 't Hooft** (University of Utrecht)
Local Conformal Symmetry in Black Holes, Standard Model, and
Quantum Gravity

Plenary Session: Mathematics and GR

- 12:10 - 12:40 **Katarzyna Rejzner** (University of York)
Effective quantum gravity observables and locally covariant QFT
- 12:40 - 13:10 **Zvi Bern** (UCLA Physics & Astronomy)
Ultraviolet surprises in quantum gravity
- 14:30 - 18:00 **Parallel Session**
- 18:45 - 20:00 **Stephen Hawking (teleconference)** (University of Cambridge)
Public Lecture Fire in the Equations

Monday afternoon, July 13th

Code	Classroom	Title	Chairperson
AC2	ChN1	MHD processes near compact objects	Sergej Moiseenko
AT1 A	FF Cabibbo	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
AT3 A	FF3	Wormholes, Energy Conditions and Time Machines	Francisco Lobo
AT4	FF6	Localized selfgravitating field systems in the Einstein and alternatives theories of gravity	Dmitry Galtsov, Michael Volkov
BH1 2-3	FM Majorana	BH1: Binary Black Holes as Sources of Multimessenger Astronomy BH2: Black hole in binary stellar system BH3: Black hole in galactic nuclei	Pablo Laguna, Anatoly M. Cherepaschuck, Stanislav O. Alexeyev
BH4 A	Blu2	Gravitational fields with sources: From compact objects to black holes	José P. S. Lemos, Paolo Pani
BN5	ChB	Self-forces and small-mass-ratio binaries	Adam Pound
BS2	FF8	Scalar fields in cosmology	Alfredo Macias
DE2	Blu1	Inhomogeneous Cosmology	T. Buchert, A. Coley, D. Wiltshire
DM1	Blu3	Interacting Dark Matter	Nikolaos Mavromatos
ES1	Matl	Exact Solutions in Four and Higher Dimensions: Mathematical Aspects	Georgy Alekseev
EU1	FF7	Semiclassical and Quantum Cosmology	Paulo Vargas Moniz
EU3	Blu4	Cosmological Singularities and Asymptotics	Spiros Cotsakis
GB2	FMCareri	The energy compositions and acceleration processes of GRB jets	Shiho Kobayashi, Stefano Covino
GN1	FF2	Gravitational physics of the galactic center	Heino Falcke
GW2	Blu5	Status of the Gravitational Wave Detectors	David Blair, Jean-Yves Vinet
NS1	FMAmaldi	Observational Constraints on the Micro and Macroscopic properties of Compact Stars	Jorge Rueda, Rodrigo Negreiros
PT1	Geo1	Tests of gravity with atom interferometers and clocks	Guglielmo Tino
PT2	Geo12	Theory of light propagation in gravitation fields	Volker Perlick
PT4 A	Geo11	Variation of Fundamental Constants	Victor Flambaum, Julian Berengut
QF1	MatV	Quantum Spacetime	Gherardo Piacitelli
QG3	MatPicone	Loop quantum gravity: cosmology and black holes	Jorge Pullin, Parampreet Singh
SF1-2	FMRasetti	SF1: Strong (EM) Field physics and Astrophysics SF2: Ground experiment and astrophysical observations in Strong Field Physics	Sang Pyo Kim, She-Sheng Xue
SN1-2 A	ChD	SN1: Supernova Explosions and Neutron Stars Dynamics SN2: Numerical simulations, SN, and GRB, connecting with massive SN	Kostas Kokkotas, Valeri Chechetkin, Alexey Aksenov
ST2	FF4	Black Holes in String Theory	Gianguido Dall'Agata
WD1-3	FM Conversi	WD1: The Status of Magnetic White Dwarfs WD3: White Dwarfs in Binaries and the Role of Gravitational Waves	Enrique Garcia-Berro, S.O. Kepler, Mukremin Kilic

Tuesday morning July 14th

Plenary Session: Quantum and Gravity

Chairperson: Gabriele Veneziano

- 09:00 - 09:35 **Abhay Ashtekar** (Institute for Gravitation & the Cosmos)
Recent Conceptual and Phenomenological Advances in Loop
Quantum Gravity
- 09:35 - 10:10 **Sergio Ferrara** (PH-TH CERN - INFN, Frascati National
Laboratories)
Supersymmetry and Inflation
- 10:10 - 10:45 **Chris Hull** (Imperial College London)
A review of generalized geometries in string theory
- 10:45 - 11:05 **Coffee Break**
- 11:05 - 11:40 **John Ellis** (King's College London)
No-Scale Inflation: a Bridge between String Theory and Particle
Physics?
- 11:40 - 12:15 **Andrew Strominger** (Harvard University)
Conformal Symmetry in the Sky
- 12:15 - 12:50 **Samir Mathur** (The Ohio State University)
Fuzzballs, Firewalls and all that
- 14:30 - 18:00 **Parallel Session**
- 18:45 - 20:00 **Rashid Sunyaev** (Max Planck Institute for Astrophysics)
Public Lecture Cosmic Microwave Background Radiation: In the Directions to
Clusters of Galaxies, Recombination of Hydrogen in the Universe
and Black-body Photosphere of our Universe

Tuesday afternoon July 14th

Code	Classroom	Title	Chairperson
AT1 B	FFCabibbo	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
AT3 B	FF3	Wormholes, Energy Conditions and Time Machines	Francisco Lobo
BH4 B	FM Conversi	Gravitational fields with sources: From compact objects to black holes	José P. S. Lemos, Paolo Pani
BH6 A	FF7	Regular and Analogue Black Holes	Stefano Liberati, Carlos Barcelo
BH8	FM Majorana	Black Holes in Higher Dimensions (Black Rings and Black Strings)	Jutta Kunz
BN3 A	FM Amaldi	Double Neutron Stars and Neutron Star White Dwarf Binaries	Thomas Tauris
BN6	FF6	Post-Newtonian and Analytic Approximations	Alexandre Le Tiec
CM1	FM Rasetti	Cosmic Microwave Background measurements	Silvia Masi, Paolo de Bernardis
DE1 A	Blu2	Dark Energy and the Accelerating Universe	Alexei Starobinski, David Polarski
DE3	Blu1	Large Scale Structure and Statistics	Thomas Buchert, Hagen Kleinert
DM2	Blu3	Results and Strategies in Dark Matter Detection	Pierluigi Belli
ES3	Mat1	Exact Solutions (Physical Aspects)	Susan Scott
GB3	FM Careri	Cosmology from GRBs	Lorenzo Amati, Massimo Della Valle
GL3	FF8	Gravitational lensing: theory and numerical modeling	Oleg Tsupko
GN2	FF2	New developments in Blazars research	Paolo Giommi, Paolo Padovani
HE1	Blu5	Experimental tests of fundamental physics with high energy gamma rays	Alessandro De Angelis, Razmik Mirzoyan
HR1	ChB	History of Relativity and Cosmology	Christian Bracco, Tilman Sauer
PT3 A	Geo1	Experimental Gravitation	Angela Di Virgilio, Claus Claus Lämmerzahl
PT4 B	Geo11	Variation of Fundamental Constants	Victor Flambaum, Julian Berengut
QF2 A	MatV	Quantum Field Theory on Curved Spacetime	Gerardo Morsella
QG2 A	MatPicone	Quantum Gravity Phenomenology	Giovanni Amelino-Camelia
SN1-2 B	ChD	<i>SN1: Supernova Explosions and Neutron Stars Dynamics</i> <i>SN2: Numerical simulations, SN, and GRB, connecting with massive SN</i>	Kostas Kokkotas, Valeri Chechetkin, Alexey Aksenov
ST3	FF4	Gauge/gravity and related correspondences	Rubik Poghossian

Wednesday morning, July 15th

Plenary Session: Precision test of GR

Chairman: Dittus Hansjoerg

- 09:00 - 09:35 **Claus Lammerzahl** (ZARM - Center Of Applied Space Technology And Microgravity)
Experimental gravitation
- 09:35 - 10:10 **Francis Everitt** (Stanford University)
Overview and Completion of Gravity Probe B
- 10:10 - 10:45 **Thibault Damour** (IHES)
Gravitational Radiation and the Problem of Motion: A Centenary Assessment
- 10:45 - 11:05 **Coffee Break**
- 11:05 - 11:40 **Michael Kramer** (Max Planck Institute for Radio Astronomy)
Probing gravity and fundamental physics with pulsars
- 11:40 - 12:15 **Jorge Rueda** (ICRANet)
The binary systems associated to short and long GRBs and their detectability Probing gravity and fundamental physics with pulsars
- 12:15 - 12:50 **David Shoemaker** (MIT LIGO Laboratory)
LIGO and the network of terrestrial gravitational wave detectors
- 14:30 - 18:00 **Free afternoon and Besso Foundation**
- 19:30 **Official Banquet**

Thursday morning, July 16th

Plenary Session: GRBs and galactic center black hole

Chairperson: Della Valle Massimo

- 09:00 - 09:35 **Tsvi Piran** (Hebrew University of Jerusalem)
Neutron Star Mergers, Gravitational Waves, Gamma-Ray Bursts and
the origin of Gold
- 09:35 - 10:10 **Neil Gehrels** (NASA)
Explosions Throughout the Universe
- 10:10 - 10:45 **Marco Tavani** (University of Rome Tor Vergata)
- 10:45 - 11:05 **Coffee Break**
- 11:05 - 11:40 **Remo Ruffini** (ICRANet)
- 11:40 - 12:15 **Chris Fryer** (University of Arizona)
Using Observations to Constrain the GRB Engine: Lessons from
Core-Collapse Supernovae
- 12:15 - 12:50 **Stefan Gillessen** (Max Planck Institute for Extraterrestrial Physics):
The Galactic Center: A stellar Ballet and a gaseous Scherzo
- 14:30 - 18:00 **Parallel Session**
- 18:45 - 20:00 **Ken'ichi Nomoto** (University of Tokyo):
Public Lecture **Sachiko Tsuruta** (Montana State University):
Temperature of Neutron Stars

Thursday afternoon, July 16th

Code	Classroom	Title	Chairperson
AC1 A	ChN1	Accretion processes onto Black Holes: Observation and Modeling	Sandip Chakrabarti
AT1 C	FF Cabibbo	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
AT2 A	FF3	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
BH7	FMConv.	Hairy Black Holes	Burkhard Kleihaus
BN1	FM Amaldi	Compact Binaries and Strong-Field Tests of Gravity	Paulo Freire, Michael Kramer
BN2	FF7	Numerical Analysis of Coalescing Binaries	Masaru Shibata
BN4	FF6	End of white dwarfs and type Ia Supernova	Yukikatsu Terada, Keiichi Maeda
BN7	FF2	Interfacing analytical and numerical relativity	Ian Hinder
CM2-3 A	FM Rasetti	Cosmology with the Cosmic Microwave Background: Implications of planck and Other Experiments in Temperature and polarization	C. Burigana, H.U. Nørgaard-Nielsen
DE1 B	Blu2	Dark Energy and the Accelerating Universe	Alexei Starobinski, David Polarski
DM3	FF5	Sterile neutrinos and cosmology	M. Shaposhnikov, A. Boyarsky, O. Ruchayskiy
ES2 A	Mat1	Theoretical Issues in GR	Dieter Brill
EU2	FF8	Quantum Fields	Vladimir Belinski
GB4	FM Majorana	Photospheric Emission in GRBs	Gregory Vereshchagin, J Michael Burgess
GB5 A	FMCareri	GRBs and the Afterglow	Chris L. Fryer, Grant J. Mathews
GW1	Blu5	Sources of Gravitational Waves	Andrew Melatos
HE2	Blu4	High Energy Astrophysical neutrinos detection	Antonio Capone
HE4	Blu3	Space missions of high energy particles and gamma-rays	Shuang Nan Zhang, Oscar Adriani
NS2	ChB	New States of Matter and Strong Electromagnetic Fields in the Universe	Cesar Zen, Aurora Perez Martinez
NS4	ChD	Neutron stars in the context of stellar evolution and nucleosynthesis	Pascal Chardonnet
PT6	Geo1	Dynamics of extended test objects equations of motion and their solution	Eva Hackmann, Dirk Puetzfeld
QF3	MatV	Operator Algebras and Quantum Field Theory	Gandalf Lechner, Giuseppe Ruzzi
QG1 A	Geo12	Loop Quantum Gravity, Quantum Geometry, Spin Foams	Jerzy Lewandowski
QG2 B	MatPicone	Quantum Gravity Phenomenology	Giovanni Amelino-Camelia
ST4	FF4	String Pheno & Cosmo	Gianfranco Pradisi
WD2	Geo11	Origin and physics of Soft Gamma-ray Repeater and Anomalous X-ray Pulsars	Manuel Malheiro, Renxin Xu

Friday morning, July 17th

Plenary Session: Cosmology and Space Science

Chairman: David Blair

- 09:00 - 09:35 **Marco Bersanelli** (Universita' degli Studi di Milano):
The astrophysical results of the Low Frequency Instrument of Planck satellite
- 09:35 - 10:10 **Jean-Loup Puget** (Université Paris XI)
The astrophysical results of the High Frequency Instrument of Planck satellite
- 10:10 - 10:45 **Viatcheslav Mukhanov** (LMU Munich)
Quantum Universe
- 10:45 - 11:05 **Coffee Break**
- 11:05 - 11:40 **Samuel C. C. Ting** (Massachusetts Institute of Technology)
The Latest Results from AMS on the International Space Station
- 11:40 - 12:15 **Francis Halzen** (University of Wisconsin-Madison)
IceCube and the Discovery of High-Energy Cosmic Neutrinos
- 12:15 - 12:50 **Katherine Freese** (University of Michigan)
- 14:30 - 18:00 **Parallel Session**
- 18:45 - 20:00 **Samuel C. C. Ting** (Massachusetts Institute of Technology)
Public Lecture
Encounters with Modern Physics

Friday afternoon, July 17th

Code	Classroom	Title	Chairperson
AC1 B	ChN1	Accretion processes onto Black Holes: Observation and Modeling	Sandip Chakrabarti
AT1 D	FF Cabibbo	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
AT2 B	FF3	Extended Theories of Gravity and Quantum Cosmology	Salvatore Capozziello, Gabriele Gionti
BH5	ChB	Geometric approaches to the thermodynamics of black holes	Hernando Quevedo
BH6 B	FF7	Regular and Analogue Black Holes	Stefano Liberati, Carlos Barcelo
BN3 B	ChD	Double Neutron Stars and Neutron Star-White Dwarf Binaries	Thomas Tauris
BS1	FF6	Black Hole foils, Boson stars	Meike List
CM2-3 B	FM Rasetti	Galaxy Clusters as probes for Cosmology and Dark Matter	Piero Rosati
DM4	Blu1	Selfgravitating systems and Dark Matter	Marco Merafina
ES2 B	Matl	Theoretical Issues in GR	Dieter Brill
GB1	FM Majorana	Fast radio bursts: observations, ideas, and prospects	Bing Zhang, Duncan Lorimer
GB5 B	Careri	GRBs and the Afterglow	Chris Fryer, Grant Mathews
GL2	FF8	Statistics and Geometry of Weak Lensing Data	Domenico Marinucci
GW3	Blu5	Lisa pathfinder and Space-Borne Gravitational Wave Detectors	Massimo Bassan, Michele Armano
HE3	Blu4	Future prospects in high energy astrophysics	Filippo Frontera, Aldo Morselli
NS3	FM Amaldi	QCD phase diagram: from nuclear astrophysics to heavy ion collisions	Debora Peres Menezes
NS5	FM Conversi	Highly magnetized neutron stars: theories, observations and connection with gamma-ray bursts	Nanda Rea
PT3 B	Geo1	Experimental gravitation	Claus Lämmerzahl, Angela Di Virgilio
PT5	Geo11	GR in the Solar System	Roberto Peron, Agnes Fienga
QF2 B	MatV	Quantum Field Theory on Curved Spacetime	Gerardo Morsella
QG1 B	Geo12	Loop Quantum Gravity, Quantum Geometry, Spin Foams	Jerzy Lewandowski
QG2 C	MatPicone	Quantum Gravity Phenomenology	Giovanni Amelino-Camelia
ST1	FF4	Branes and Instantons in String Theory	Alberto Lerda

Saturday morning, July 18th

Plenari Session: The frontiers

Chair: Felix Aharonian

- 09:00 - 09:35 **Karl Heinz Kampert** (Bergische Universitat Wuppertal)
Ultra High Energy Cosmic Rays: What has been learned and where
will we go?
- 09:35 - 10:10 **Christian Stegmann** (DESY)
High energy gamma-rays
- 10:10 - 10:45 **Werner Hofmann** (Max Planck Institute for Nuclear Physics)
Perspectives from CTA in Relativistic Astrophysics
- 10:45 - 11:05 **Coffee break**
- 11:05 - 11:40 **Paolo Giommi** (ASDC)
Multi-frequency and Multi-messenger Astrophysics With Blazars:
Recent Results and Predictions for Future Observations with VHE
gamma-ray and Neutrino Detectors
- 11:40 - 12:15 **Rita Bernabei** (University of Rome Tor Vergata)
Direct detection of Dark Matter particles
- 12:15 - 12:50 **Stefano Vitale** (University of Trento)
LISA Pathfinder
- 12:50 **Remo Ruffini** (ICRANet)
Concluding Remarks

FONDAZIONE MARCO BESSO



Albert Einstein, Michele Besso and Marcel Grossmann

*13-17 July 2015
at Fondazione Besso
Largo di Torre Argentina, 11*

***From Monday 13 to Friday 17 the exhibition will be open from 2:30 to 10:00 pm
to all participants of MGXIV and accompanying persons.
Please, show your badge at the entrance.
Free access.***



A celebration of

The International Year of Light by UNESCO
The 100th Anniversary of the Einstein Equations
The Golden Jubilee of Relativistic Astrophysics

a Parallel Meeting of MGXIV

under the aegis of

Besso Foundation

ICRANet

Hebrew University of Jerusalem

Albert Einstein Archives and Racah Institute for physics

Max-Planck-Institut für Wissenschaftsgeschichte

Monday 13

Session “History of Science”, Chaired by **Jürgen Renn**

Exhibition and projection of: “Einstein Anno Zero”

(from RAI - TG2 Dossier)

Wednesday 15 - 5:00-7:00 pm

Exhibition

Ceremony by invitation only (137 invited)

Chairperson:

Maria Lia Orsa Lumbroso

Speakers:

Remo Ruffini,

Director ICRANet

Jürgen Renn,

Director Max-Planck-Institut für Wissenschaftsgeschichte

Hanoch Gutfreund,

Former President of The Hebrew University of Jerusalem

Claudia Graf,

granddaughter of Marcel Grossmann,

and **Tilman Sauer**

Presentation of the biography of Marcel Grossmann by Claudia Graf and Tilman Sauer
Presentation of the two volumes by Princeton University co-authored by Hanoch Gutfreund and Jürgen Renn

Presentation of the book ICRANet and relativistic astrophysics
Guided viewing of the exhibition by Hanoch Gutfreund.

Thursday 16

Session “History of Science”, Chaired by **Hanoch Gutfreund**
Exhibition and projection of: “Il Caso Neutrino” (from RAI teche)



University Map



- | | | | |
|--------------|--|--------------|--|
| CU001 | AULA MAGNA | CU014 | CHIMICA Cannizzaro (Ch)
aula D
aula H
aula B |
| CU033 | FISICA Fermi (FF)
aula Cabibbo
aula 2
aula 3
aula 4
aula 5
aula 6
aula 7
aula 8 | CU006 | MATEMATICA Castelnuovo (Mat)
aula Picone
aula I
aula V |
| CU013 | FISICA Marconi (FM)
aula Amaldi
aula Majorana
aula Rasetti
aula Careri
aula Conversi | CU005 | GEOLOGIA (Geo)
aula 1
aula 11
aula 12 |
| CU032 | CHIMICA Caglioti (ChN)
aula 1 | CU028 | AULETTE BLU (Blu)
aula blu 1
aula blu 2
aula blu 3
aula blu 4
aula blu 5 |

Aula Magna Entrance Instructions

Because of the great number of participants, precise rules must be followed to enter the Aula Magna plenary sessions. We suggest you arrive by 8:00 to access the best seating possible.

8:00-8:40 First 5 rows of main seating area are reserved and accessed from the front entrance. Remaining rows are entered from the back terrace central doors.

8:40-8:50 Balcony is entered from the back terrace right door.

8:50-9:00 Overflow enters Fisica Marconi aula Amaldi for remote screen projection.