

# SIGRAV XIX

# SIGRAV CONFERENCE 2010

*Scuola Normale Superiore, Pisa*

*Virgo – EGO, Cascina (Pi)*

*September 27 – October 1 2010*

*and*

# SIGRAV SCHOOL 2010

*Scuola Normale Superiore, Pisa*

*October 2 – 3 2010*

**Organizing Committee (Conference):**

*Carlo IAZEOLLA, Mauro FRANCAVIGLIA (Secr.), Euihun JOUNG, Marcella Giulia LORENZI, Rakibur RAHMAN,  
Augusto SAGNOTTI (Chair.), Massimo TARONNA*

**Organizing Committee (School):**

*Massimo BIANCHI, Luca LUSANNA*

**SUPPORTED by:** ERC Adv. Grant n. 226455 SUPERFIELDS – INFN – MIUR-PRIN 2007-5ATT78  
Scuola Normale Superiore – SIGRAV – U. Calabria

*Under the patronage of:* INdAM – GNFM

# **Monday September 27**

## **Aula Bianchi**

9:30 – 10:30 *Registration and Opening of Ballots for the SIGRAV Elections*

10:30 – 11:00 Welcome Coffee

11:00 – 11:20 Welcome:

Salvatore SETTIS, Director of Scuola Normale

Riccardo BARBIERI, Dean of the Class of Sciences

Mauro FRANCAVIGLIA, SIGRAV President

## **Plenary Session**

**Chair: Pietro MENOTTI (U. Pisa)**

11:20 – 12:00 Riccardo BARBIERI *Particle Physics: the Standard Model and Beyond*

12:05 – 12:45 Paolo DE BERNARDIS *Observations of the CMB: Planck and Beyond*

12:45 – 14:00 *LUNCH*

# **Monday September 27**

## ***Aula Bianchi***

### ***Plenary Session***

**Chair: Franco STROCCHI (Scuola Normale and INFN)**

14:00 – 14:40	Eugenio BIANCHI	<i>Loop Quantum Gravity</i>
14:45 – 15:25	Giulio MAGLI	<i>Exact Solutions and Collapse</i>
15:30 – 16:10	Mauro CARFORA	<i>Back and Forth with the Ricci Flow</i>
16:15 – 16:45	<i>Coffee Break</i>	

**Chair: Franco CERVELLI (INFN - Pisa)**

16:45 – 17:25	Ronaldo BELLAZZINI	<i>Deciphering the High – Energy Universe with the Fermi Large – Area Telescope</i>
17:30 – 18:10	Luigi CACCIAPUOTI	<i>High – Performance Clocks and Links for Testing General Relativity in Space</i>
18:15 – 18:55	Salvatore CAPOZZIELLO	<i>Cosmography and Large – Scale Structure from Higher – Order Gravity</i>



# **Tuesday September 28**

## **Aula Bianchi**

### **Parallel Session A (Classical and Quantum Gravity)**

**Final Meeting of the PRIN Project 2007 - 5ATT78**

**“Symmetries of the Universe and of the Fundamental Interactions”**

**Chair: Anna CERESOLE (INFN – Torino)**

14:00 – 14:40	Gianguido DALL’AGATA [Review]	<i>Black Holes in Supergravity: the non – BPS Sector</i>
14:45 – 15:10	Giuseppe D’APPOLLONIO	<i>String – Brane Scattering at High Energy</i>
15:15 – 15:40	Jarah EVSLIN	<i>Gravity Duals of Hydrodynamic Vortices and Boundaries</i>
15:45 – 16:10	Davide FIORAVANTI	<i>Integrability and Supersymmetric Gauge Theories</i>
16:15 – 16:45	<i>Coffee Break</i>	
14:00 – 14:40	Alberto LERDA [Review]	<i>Instantons in String Theory</i>
17:25 – 17:50	Stefano GIUSTO	<i>A Window on non – BPS Solutions in Supergravity</i>
17:55 – 18:20	Pietro Antonio GRASSI	<i>Superstring Corrections to Supergravity from Multi – Loops</i>
18:25 – 18:50	Francisco MORALES	<i>Flux Attractors</i>
18:55 – 19:20	Marta ORSELLI	<i>A Decoupling Limit of AdS/CFT</i>
19:25 – 20:05	Fabio RICCIONI [Review]	<i>E11 and Supergravity</i>

# **Tuesday September 28**

## **Aula Mancini**

### **Parallel Session B (Astrophysics and Cosmology)**

**Chair: Luigi STELLA (INAF – Osservatorio Astronomico di Roma)**

14:00 – 14:40	Giorgio MATT [Review]	<i>Probing Strong Gravity effects in Black – Hole Accreting Systems</i>
14:45 – 15:10	Enrico BOZZO	<i>Accretion Processes in Neutron Star X – Ray Binaries</i>
15:15 – 15:40	Raffaella SCHNEIDER	<i>Stochastic Backgrounds of GW's from Extragalactic Populations</i>
15:45 – 16:10	Donato BINI	<i>Poynting – Robertson Effect in Black – Hole Spacetimes</i>
16:15 – 16:45	<i>Coffee Break (near Aula Bianchi)</i>	
16:45 – 17:25	Tomaso BELLONI [Review]	<i>Probing Strong Gravity with X – Ray Timing around Compact Objects</i>
17:25 – 17:50	Angelo ANTONELLI	<i>A Gamma Ray Burst at <math>z = 8.1</math></i>
17:55 – 18:20	Dafne GUETTA	<i>Gravitational Waves from Gamma Ray Bursts</i>
18:25 – 18:50	Leonardo GUALTIERI	<i>Neutron Star Extra – Galactic Objects and Gravitational Wave Emission</i>
18:55 – 19:20	Simone DALL'OSSO	<i>Magnetars as Sources of Gravitational Waves</i>
19:25 – 20:05	Elena PIAN [Review]	<i>The Connection between Gamma Ray Bursts and Core Collapse Supernovae</i>

# **Wednesday September 29**

***Aula Bianchi***

## ***Plenary Session***

**Chair: Ken KONISHI (U. Pisa)**

9:00 – 9:40 Gary GIBBONS

*The Shape of Black Holes*

9:45 – 10:25 Dario GRASSO

*Recent Results in Cosmic – Ray Physics: Implications and Perspectives*

10:30 – 10:55 *Coffee Break*

**Chair: Italo MANNELLI (Scuola Normale)**

11:00 – 11:40 Luciano IESS

*Deep – Space Navigation as a Tool to Test the Laws of Gravity*

11:45 – 12:25 Giovanni LOSURDO

*The Search for Gravitational Waves*

12:30 – 14:00 *LUNCH*

# **Wednesday September 29**

## ***EGO - Virgo site***

### ***Plenary Session***

***Chair: Adalberto GIAZOTTO (INFN - Pisa)***

*14:00 Bus to the Virgo site*

*15:00 – 16:00 Tour of the Virgo site*

*16:00 – 16:40 Michele MAGGIORE Gravitational Waves: Motivations and Perspectives*

*16:45 – 17:15 Coffee Break*

*17:15 – 17:55 Luigi STELLA Magnetars: the Most Violent Neutron Stars*

*18:15 Bus to Pisa*

# **Thursday September 30**

***Aula Bianchi***

## ***Plenary Session***

***Chair: Lorenzo FOÀ (Scuola Normale)***

9:45 – 10:25 Piergiorgio PICOZZA

*Antimatter and Dark Matter Search in Space*

11:45 – 12:25 Luigi ROLANDI

*First Results from the CMS Experiments and Perspectives for 2010/2011*

10:30 – 11:00 *Coffee Break*

***Chair: Mario TONIN (U. Padova)***

11:00 – 11:40 Anastassios PETKOU

*Holography as a an Initial – Value Formulation of Gravity*

11:45 – 12:25 Luciano REZZOLLA

*Using Numerical Relativity to Explore Fundamental Physics and Astrophysics*

12:30 *Closing of Ballots for the SIGRAV Elections*

12:30 – 14:00 *LUNCH*

# Thursday September 30

## Aula Bianchi

### Parallel Session A (Classical and Quantum Gravity)

Chair: Mauro FRANCAVIGLIA (U. Torino)

13:50 – 14:30	Gabriele TRAVAGLINI [Review]	<i>Simplicity of Scattering Amplitudes</i>
14:35 – 15:00	Andrea CAMPOLEONI	<i>Asymptotic Symmetries of 3D Gravity Coupled to Higher Spins</i>
15:00 – 15:25	Ugo MOSCHELLA	<i>The de Sitter Universe</i>
15:30 – 16:10	Sergio ZERBINI [Review]	<i>The Tunneling Method for Spherically Symmetric Space-times</i>
16:15 – 16:45	<i>Coffee Break</i>	

#### Quantum Gravity (Aula Bianchi) - Chair: Anna CERESOLE (INFN – Torino):

16:45 – 17:10	Bianca Letizia CERCHIAI	<i>E7 and Applications in Supergravity</i>
17:15 – 17:40	Gerardo CRISTOFANO	<i>Scaling Astrophysical Structures from Quantization of Primordial Black Holes</i>
17:45 – 18:10	Remo GARATTINI	<i>Modified Dispersion Relations: from Black – Hole Entropy to the Cosmological Constant</i>
18:15 – 18:40	Andrea MAURI	<i>Membranes and Chern – Simons Theory</i>
18:45 – 19:10	Cosimo STORNAIOLO	<i>Cardy – Verlinde equation in Spherically Symmetric Gravitational Collapse</i>
19:15– 19:40	Enrico TRINCHERINI	<i>The Galileon</i>

#### Classical Gravity (Collegio Puteano) - Chair: Mauro FRANCAVIGLIA (U. Torino):

16:45 – 17:10	Mariafelicia De LAURENTIS	<i>Axially Symmetric Solutions in <math>f(R)</math> Gravity</i>
17:15 – 17:40	Noemi FRUSCIANTE	<i>Self – Gravitating Systems in the Newtonian Limit of <math>f(R)</math> Gravity</i>
17:45 – 18:10	Daniele MALAFARINA	<i>Black Hole vs Naked singularity from Collapse of a Polytopic Perfect Fluid</i>
18:15 – 18:40	Sara QUINTAVALLE	<i>Critical Phenomena in Spherical Gravitational Collapse</i>
18:45– 19:10	Angelo TARTAGLIA	<i>Space Navigation Using Pulsars</i>
19:15– 19:40	Daniele VERNIERI	<i>Duality Transformations in <math>f(R)</math> Gravity</i>

20:00 - 21:00 SIGRAV Plenary Assembly

# **Thursday September 30**

## **Aula Mancini**

### **Parallel Session C (Experimental Gravity)**

**Chair: Eugenio COCCIA (U. Roma "Tor Vergata")**

14:00 – 14:35	Flavio VETRANO [Review]	Gravitational Wave Detection via Atomic Interferometry
14:35 – 15:00	Michele PUNTURO	The Einstein Telescope
15:00 – 15:25	Riccardo DE SALVO	Anomalous Low – Frequency Dissipation in Metals: Problems and Solutions for Gravitational – Wave Detectors
15:25 – 15:50	Francesco RONGA	Dark Matter and Resonant Gravitational Wave detectors
15:50 – 16:15	Matteo Luca RUGGIERO	A Laser Gyroscope System to Detect Gravitomagnetic Effects on Earth
16:15 – 16:45	<i>Coffee Break (near Aula Bianchi)</i>	
16:45 – 17:20	Anna NOBILI [Review]	GG: Toward a Space Test of the Equivalence Principle to $10^{-18}$
17:20 – 17:45	Valerio IAFOLLA	TEPEE/GReAT, an Experiment to Test the Equivalence Principle: an Update on its Development
17:45 – 18:10	Roberto DE PIETRI	Physics from the Drag-Free Motion of the LISA Constellation
18: 10 – 18:35	Giuseppe PUCACCO	Autonomous Perturbations of LISA Orbits
18:35 – 19:00	David M. LUCCHESI	An Accurate Measurement of the General Relativity Secular Advance of LAGEOS II Pericenter and New Constraints on non-Newtonian Gravity in the Field of the Earth
19:00 – 19:25	Valerio IAFOLLA	The Key Role of the ISA Accelerometer in the Radio Science Experiments of the BepiColombo Mission to Mercury

**20:00 - 21:00 SIGRAV Plenary Assembly**

# **Friday October 1**

## **Aula Bianchi**

### **Plenary Session**

**Chair: Roberto IENGO (SISSA)**

9:00 – 9:40	Massimo BIANCHI	<i>Phenomenological Aspects of Superstring Theory</i>
9:45 – 10:25	Kellog STELLE	<i>Ultraviolet Divergences and non – Renormalization Theorems in Supergravity</i>
10:30 – 10:55	<i>Coffee Break</i>	

**Chair: Carlo BEMPORAD (U. Pisa)**

11:00 – 11:40	Licia VERDE	<i>Connecting Cosmology to Fundamental Physics: Examples</i>
11:45 – 12:25	Guglielmo TINO	<i>Experimental Tests of Gravity with Cold Atoms</i>
12:30 – 14:00	<i>LUNCH</i>	

# **Friday October 1**

**Sala Azzurra**

## **Plenary Session**

**Chair: Luciano GIRARDELLO (U. Milano Bicocca)**

- 14:00 – 14:40 Stefano VITALE *LISA Pathfinder, LISA, and Gravitational Wave Astronomy across the Entire Universe*
- 14:45 – 15:25 Alberto ZAFFARONI *Aspects of Gauge/Gravity Dualities*
- 15:30 – 16:10 Luca LUSANNA *Conference Highlights*
- 16:15 – 16:45 *Coffee Break*

**Chair: Mauro FRANCAVIGLIA (U. Torino – SIGRAV President)**

- 17:00 – 20:20 *SIGRAV Prizes and Amaldi Medal*
- 17:00 – 17:15 *SIGRAV Prizes (Introduction by L. Stella, A. Zaffaroni)*
- 17:15 – 17:55 Dario MARTELLI (SIGRAV Prize 2010) *AdS/CFT Correspondence and Geometry*
- 18:00 – 18:40 Rosalba PERNA (SIGRAV Prize 2010) *Extreme Phenomena in the Universe*
- 18:45 – 19:25 Alessandro TOMASIELLO (SIGRAV Prize 2010) *The Shape of the String Universe*
- 19:30 – 19:40 *Amaldi Medal (Introduction by M. Francaviglia)*
- 19:40 – 20:10 Thibault DAMOUR (Amaldi Medal 2010) *“Analytical Relativity” of Binary Black Holes and/or Neutron Stars*
- 20:15 *Concluding Remarks*
- 20:30 *Train for Conference Dinner (Ristorante Poldino, San Rossore)*

# SIGRAV SCHOOL 2010

## Saturday October 2

9:30 – 10:55	Gabriele TRAVAGLINI	<i>Scattering Amplitudes in Gauge Theory and Gravity, I</i>
11:00 – 12:25	Gary GIBBONS	<i>Some Geometry of Supergravity Black Holes. I</i>
12:30 – 13:15	Kellog STELLE	<i>Duality and Black Hole Solutions in Supergravity, I</i>
13:30 – 14:15	<i>LUNCH</i>	
14:15 – 14:55	Kellog STELLE	<i>Duality and Black Hole Solutions in Supergravity, II</i>
15:00 – 16:25	Gabriele TRAVAGLINI	<i>Scattering Amplitudes in Gauge Theory and Gravity, II</i>
16:30 – 17:55	Gary GIBBONS	<i>Some Geometry of Supergravity Black Holes. II</i>

## Sunday October 3

9:30 – 10:55	Kellog STELLE	<i>Duality and Black Hole Solutions in Supergravity, III</i>
11:00 – 12:25	Anastassios PETKOU	<i>Applied AdS/CFT, I</i>
12:30 – 13:15	Eugenio BIANCHI	<i>Introduction to Loop Quantum Gravity, I</i>
13:30 – 14:15	<i>LUNCH</i>	
14:15 – 14:55	Eugenio BIANCHI	<i>Introduction to Loop Quantum Gravity, II</i>
15:00 – 16:25	Anastassios PETKOU	<i>Applied AdS/CFT, II</i>
16:30 – 18:00	Eugenio BIANCHI	<i>Introduction to Loop Quantum Gravity, III</i>