



9<sup>th</sup> VIENNA CENTRAL EUROPEAN SEMINAR  
ON PARTICLE PHYSICS AND QUANTUM FIELD THEORY

**November 30 - December 02, 2012**

**DARK MATTER, DARK ENERGY, BLACK HOLES**

**AND**

**QUANTUM ASPECTS OF THE UNIVERSE**

***PROGRAM***

Lecture Hall: "Christian-Doppler-Hörsaal"

Faculty of Physics, University of Vienna

Strudlhofgasse 4, 3<sup>rd</sup> floor, 1090 Vienna

Supported by:

The Austrian Federal Ministry of Science and Research

The Faculty of Physics, University of Vienna

FWF Doctoral Program: Complex Quantum Systems (CoQuS)

COST Action MP1006, Fundamental Problems in Quantum Theory

The Erwin Schrödinger International Institute of Mathematical Physics

The Vienna University of Technology

The Institute of High Energy Physics of the Austrian Academy of Sciences

The Vienna Convention Bureau

**Nov. 30, 2012, Friday**

|               |   |   |
|---------------|---|---|
| 09:00 - 09:10 | <i>Helmuth Hüffel</i> (Vienna)                  | Opening Address   |
| 09:10 - 09:55 | <i>Paolo Natoli</i> (Ferrara)                   | Cosmology with Planck   |
| 10:00 - 10:45 | <i>Jochen Weller</i> (Munich)                   | Constraining Cosmic Acceleration  |
| 10:50 - 11:20 |   | <b>COFFEE</b>   |
| 11:20 - 11:40 | <i>Dominik Schwarz</i> (Bielefeld)              | Newtonian versus Relativistic Cosmology   |
| 11:45 - 12:30 | <i>Josef Pradler</i> (Johns Hopkins University) | Rare events underground: Dark Matter interpretation and new physics opportunities |
| 12:35 - 12:55 | <i>Katarina Markovic</i> (Munich)               | Cosmological Structure of Warm Dark Matter  |
| 13:00 - 14:15 |   | <b>LUNCH</b>  |
| 14:15 - 15:05 | <i>Andrea Campoleoni</i> (Potsdam)              | Higher-spin gravity   |
| 15:10 - 15:30 | <i>Andrea Puhm</i> (Gif-sur-Yvette)             | Unitarity, information, black holes and fuzzballs                                 |
| 15:35 - 15:55 | <i>Michael Gary</i> (Vienna)                    | Holography and the Gravitational S-Matrix   |
| 16:00 - 16:20 |   | <b>COFFEE</b>   |
| 16:20 - 16:40 | <i>Brian Dolan</i> (Maynooth)                   | Black holes and the van der Waals equation of state                               |
| 16:45 - 17:05 | <i>Enikő Regős</i> (Budapest)                   | Dark Energy Time Variation and Progenitor Evolution from CLASH HST Supernovae Ia  |

Before the Public Lecture of Sir Roger Penrose there is the possibility to join the Lise Meitner Lecture given by Renate Loll:

|                 |                               |   |
|-----------------|-------------------------------|---|
| 17:15 - 18:30 * | <i>Renate Loll</i> (Utrecht)  | <b>LISE MEITNER LECTURE: Mysterious Quantum Spacetime: Why 3+1 sometimes equals 2</b>   |
| 18:30 - 19:00   |                               | <b>REFRESHMENTS</b>   |
| 19:00 - 20:00 * | <i>Roger Penrose</i> (Oxford) | <b>PUBLIC LECTURE: Dark Energy, Dark Matter, and Black Holes, as Essential Ingredients of a New Cyclic Theory of the Universe</b> |

\* These lectures take place at the Lise Meitner Lecture Hall, 1<sup>st</sup> floor

**Dez. 01, 2012, Saturday**

|               |                                    |   |
|---------------|------------------------------------|---|
| 09:00 - 09:45 | <i>Seth Lloyd</i> (MIT)            | The quantum geometric limit   |
| 09:50 - 10:35 | <i>Ivete Fuentes</i> (Nottingham)  | Moving cavities and detectors for relativistic quantum information processing                         |
| 10:40 - 11:10 |                                    | <b>COFFEE</b>   |
| 11:10 - 11:30 | <i>Tim Langen</i> (Vienna)         | Relaxation and Prethermalization in an Isolated Quantum System  |
| 11:35 - 11:55 | <i>Nicolai Friis</i> (Nottingham)  | Entanglement Generation in Relativistic Quantum Fields  |
| 12:00 - 12:45 | <i>Margaret Reid</i> (Melbourne)   | Quantum mechanics versus local reality: fields and atoms  |
| 12:50 - 14:15 |                                    | <b>LUNCH</b>  |
| 14:15 - 15:00 | <i>Beatrix C. Hiesmayr</i> (Brno)  | Testing Foundational Issues of Quantum Mechanics at Accelerator Facilities                            |
| 15:05 - 15:50 | <i>Antonio Di Domenico</i> (Rome)  | Hunting for CPT symmetry and Quantum Mechanics violations in neutral meson systems                    |
| 15:55 - 16:25 |                                    | <b>COFFEE</b>   |
| 16:25 - 16:45 | <i>Alfredo Iorio</i> (Praha)       | Probing fundamental physics on graphene: Weyl symmetry, Beltrami pseudosphere, and the Hawking effect |
| 16:50 - 17:35 | <i>Nick E. Mavromatos</i> (London) | CPT in the Early Universe and the Observed Baryon Asymmetry   |
| 17:40 - 18:30 | <i>Hartmut Abele</i> (Vienna)      | Spectroscopy of Gravity   |

|              |  |                       |
|--------------|--|-----------------------|
| 18:30- 19:00 |  | <b>POSTER SESSION</b> |
|--------------|--|-----------------------|

19:00 - ... **RECEPTION**

**Dez. 02, 2012, Sunday**

|               |                                    |   |
|---------------|------------------------------------|---|
| 09:00 - 09:45 | <i>Abhay Ashtekar</i> (Penn State) | Quantum Gravity and the Very Early Universe                               |
| 09:50 - 10:35 | <i>Timothy Clifton</i> (London)    | Does Dark Energy Exist?   |
| 10:40 - 11:10 |                                    | <b>COFFEE</b>   |
| 11:10 - 11:30 | <i>Dijana Tolic</i> (Zagreb)       | Trapped surfaces in a hadronic fluid                                      |
| 11:35 - 11:55 | <i>Silvije Domazet</i> (Zagreb)    | Renormalization group scale-setting in astrophysical systems              |
| 12:00 - 12:20 | <i>Adriano Contillo</i> (Mainz)    | Primordial perturbation spectra in Renormalisation Group driven cosmology |
| 12:25 - 12:30 | <i>H. Hüffel</i> (Vienna)          | Closing Remarks   |