Mathematical Physics Seminar

Summer Semester 2022. Fridays / Wednesdays.

- Zoom links for online talks will be sent by e-mail (or see below).
- Zoom links for online talks of the Cracow-Poznań-Warsaw talks are also available `https://www.fuw.edu.pl/~exact/`
  shortly before a talk.

04.03.2022 17:00 Joseph Schindler (UCSC) *Penrose diagrams for explicit models of black hole evaporation.* [Online, joint talk with UW and UJ]

Abstract: Though a full description of black hole radiation may require quantum gravity, many analyses of BH evaporation still involve, either implicitly or explicitly, key assumptions about some classical BH spacetime, often expressed in the form of (Penrose) spacetime diagrams. In this talk we discuss how such diagrams can be exactly generated for specific models - providing detailed depictions of both local and global structure - and ask what can be learned by doing so. We compare naive models to those approximating a semiclassical back reaction, as well as comparing singular and curvature-regulated models. We then consider implications for various unitarity questions including long term and Page time unitarity, and identify some open questions for further discussion.

11.03.2022 14:15 Paweł Duch (AMU) TBA. [Online, joint talk with UW and UJ]

30.03.2022 15:00 Azam Jahandideh (AMU). Stochastic quantisation. [On site].

06.04.2022 15:00 Azam Jahandideh (AMU). Stochastic quantisation. [On site].

13.04.2022 15:00 Janik Kruse (AMU). Haag theorem. [On site].

27.04.2022 15:00 Abhishek Goswami (AMU). A Small and Large Field Expansion. [On site].

29.04.2022 14:15 Paolo Meda (Universita di Genova). Semiclassical Gravity in Cosmology and Black Hole Physics.

> Semiclassical Gravity and Quantum Field Theory in Curved Spacetimes describe the propagation of a quantum matter field over classical curved spacetimes. Solutions of the so-called semiclassical Einstein equations, which govern the interplay between matter and geometry in the semiclassical regime, incorporate the backreaction of the quantum field on the background geometry. In this talk, I present some applications of the semiclassical Einstein equations in the framework of Cosmology and Black Hole Physics. In the former case, the proof of existence and uniqueness of local cosmological solutions is reviewed for a free massive scalar field arbitrary coupled with the curvature. In the latter case, the evaporation of spherically symmetric dynamical black holes sourced by the quantum trace anomaly is shown for a free massless, conformally coupled scalar field. Finally, the linear stability of semiclassical theories of gravity with higher-order derivative terms is discussed in a toy model, which mimics the evolution induced by semiclassical Einstein equations in physically relevant backgrounds, such as cosmological spacetimes.

Zoom link:

`https://us02web.zoom.us/j/87158764274?pwd=QTdydXd3K1N4Vnpoc094N1o4ZTVNZz09`

(Meeting ID: 871 5876 4274 Passcode: 438484)

29.04.2022 16:00 Elek Csobo (University of Innsbruck) On blowup for the energy supercritical quadratic wave equation. [Online, joint talk with UW and UJ]

> We study the singularity formation for the focusing quadratic wave equation in the energy supercritical case, i.e., for $d \geq 7$. We establish the existence of a new, non-trivial, self-similar blow-up solution $u*$ in explicit form. For $d = 9$, we investigate the stability of $u*$without any symmetry assumptions on the initial data and show that there is a family of perturbations that leads to blow-up via $u*$. In similarity coordinates, this family corresponds to a co-dimension one Lipschitz manifold modulo translation symmetries. This is a joint work with Birgit Schörkhuber and Irfan Glogic.

Zoom link:

`https://us02web.zoom.us/j/87158764274?pwd=QTdydXd3K1N4Vnpoc094N1o4ZTVNZz09`

(Meeting ID: 871 5876 4274 Passcode: 438484)

11.05.2022 15:00 Bartosz Biadasiewicz (AMU). Wightman axioms for the free field. [On site.]

18.05.2022 15:00 Dariusz Bugajewski (AMU). Fixed point theorems. [On site].

25.05.2022 15:00 Wojciech Dybalski (AMU). Geometric aspects of the Balaban's variational problem. [On site].

01.06.2022 15:00 Bartosz Biadasiewicz (AMU). Practice talk for the LQP workshop in Erlangen. [On site, room with beamer.]

15.06.2022 13:30 Azam Jahandideh (AMU). Practice talk for the midterm evaluation. [On site, room with beamer.]

22.06.2022 15:00 Bartosz Biadasiewicz (AMU). Practice talk for the LQP workshop in Erlangen II. [On site, room with beamer.]

11.07.2022 15:00 Azam Jahandideh (AMU). Practice talk for Tübingen Workshop [On site, B1-7/8]

14.07.2022 14:00-17:00 Tübingen Workshop [Online]. For zoom link see: `https://www.math.uni-tuebingen.de/de/forschung/maphy/personen/peterpickl/15th-colloquium-on-mathe`

20.07.2022 15:00 Janik Kruse (AMU). Ergodic Theory and Interaction in QFT. [On site].

27.07.2022 15:00 Yoh Tanimoto (Tor Vergata). Unitary vertex algebras and Wightman conformal field theories [On site].

27.07.2022 16:30 Alexander Stottmeister (Univ. Hannover). Constructing the disorder/order parameter of the Ising QFT from the lattice. [On site].