A PRACTICAL MINI-COURSE ON APPLIED HOLOGRAPHY

MATTEO BAGGIOLI
IFT MADRID

ABSTRACT

This is a concise and pragmatic course on Applied Holography and especially the basic analytic and numerical techniques involved. The lectures are not focused on the large theoretical and fundamental background, which can be found already in several places in the literature, but rather on concrete applications of Bottom-Up AdS-CFT to Hydrodynamics, QCD and Condensed Matter. The idea is to accompany the students step by step through the various benchmark examples with a classmate attitude, providing details of the computations and open-source numerical codes in Mathematica, and sharing simple tricks and warnings. At the end of this path, the students will be in possess of all the fundamental skills and tools to learn by themselves more advanced techniques and to produce independent and novel research on the topic.

LIST OF TOPICS

⋆ Motivations and introduction to Bottom-Up Holography and the Holographic Dictionary;

⋆ Numerical and Analytic methods for Holographic Green Functions (Examples: viscosity, elasticity, conductivity);

⋆ Near-Horizon geometries and $T = 0$ analysis (Examples: η/s scaling at $T \to 0$, BF bound and SC instability);

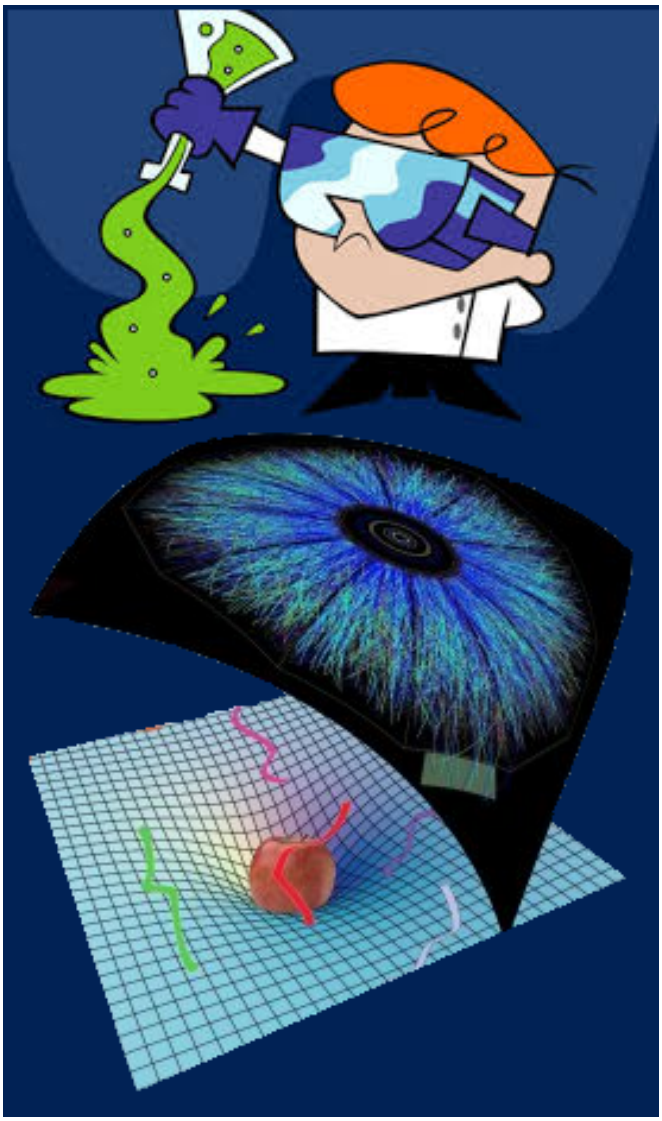
⋆ Membrane paradigm and DC conductivities (Examples: KSS bound and thermoelectric transport);

⋆ Numerical and analytic methods for Quasinormal Modes and Hydrodynamic excitations (Examples: Golstone diffusion);

⋆ Matching method, Determinant method, Gauge Invariant variables, Master fields and many more tricks . . .

INFORMATION

The lectures are intended for Master Students, PhD Students and Postdoctoral Researchers. It is suggested to bring your own laptop to the lectures with a working version of the Mathematica software. The notes for the lectures can be found in Arxiv or in the website: https://members.ift.uam-csic.es/matteo.baggioli/.



ORGANIZER

Dr. Ayan Mukhopadhyay
Department of Physics, Indian Institute Of Technology Madras, Chennai
Contact: ayan@iitm.ac.in

September 16-20 · 2019
Department of Physics, Indian Institute Of Technology Madras, Chennai.