

Personal Information

Name: Ulyana Dupletsa

Date of Birth: 1st January 1994

Citizenship: Italian, Ukrainian

Actual position: graduate student at the University of Milan-Bicocca

Personal webpage: ulyanadupletsa.github.io

Education

University of Milan-Bicocca

- *Master's degree in Theoretical Physics, Milan* 2017–2019

- Final degree grade: 110/110 cum laude
- Average class grade: 29.8/30
- Thesis advisor: Alberto Zaffaroni
- Thesis title: 'Thermodynamic Aspects of AdS_4 Black Holes in $N = 2$ Gauged Supergravity'

University of Milan-Bicocca

- *Bachelor's degree in Physics, Milan* 2013–2017

- Final degree grade: 110/110 cum laude
- Average class grade: 29/30
- Thesis advisor: Monica Colpi
- Thesis title: 'Supermassive Binary Black Holes and their Dynamics in Galactic Nuclei'

Research Activity

Master's thesis

The project analyzes thermodynamic properties of a class of static magnetically charged AdS_4 black holes resulting as solutions of $N = 2$ Fayet-Iliopoulos gauged supergravity theory, coupled with running scalars. Particular focus is devoted in investigating the relation between the on-shell gravitational action and the entropy for a class of AdS black holes, which states that the on-shell gravitational action, when evaluated at its BPS limit, equals minus the black hole entropy, calculated as the area of the event horizon. It should hold for consistency, when considering the thermodynamic relation between the black hole entropy and the dual field theory partition function, on one side, and the holographic correspondence between the dual field theory partition function and the on-shell gravitational action, on the other. We find that its validity depends on the choice of boundary conditions for the scalar fields.

Bachelor's thesis

The project deals with the analysis of the coalescence time of supermassive black hole binaries. The aim is

to investigate whether such systems are able to coalesce in less than the Hubble time. If so, they would become a promising source of gravitational waves for space based gravitational detectors. The results vary according to the binary mass ratio and to the type and the density profile of the hosting galaxy, giving an overall range between 0.1 to some tens of Gyrs.

Minor Computational Projects

These are two programs written in C that implement Markov Chain algorithms to solve problems in physics which I developed as part of the Computational Physics course

- A numerical resolution for the simple harmonic oscillator energy for the calculation of the energy gap between the fundamental and the first level
(<https://github.com/ulyanadupletsa/HarmonicOscillator>)
- Analysis of observables dependent on magnetization for a scalar field theory on lattice with quartic interaction. A Hamiltonian approach in Monte Carlo methods is used
(<https://github.com/ulyanadupletsa/LatticePhi4Theory>)

Skills

Programming languages: C/C++, Python, Mathematica, Matlab

Other scientific tools: LaTeX

Languages: Italian (mother tongue), Ukrainian (mother tongue), English (fluent)