

GIPE25: EVENT PROGRAM

TUESDAY 16/09

 13:30-14:30

 University of Trieste, room 2A, building D

WELCOME

Participants will be welcomed with gadgets and helpful information to check-in at the Controvento Hostel / ICTP Guest House.

 14:30-17:30

 University of Trieste, room 2A, building D

14:30-15:00

OPENING CEREMONY

Welcome to participants and the event's introduction, followed by institutional greetings.

15:00-16:30

Introducing the Department of Excellence, followed by presentations of some of GIPE25's partners.

16:30-17:30

Coffee break

 17:30-20:00

FREE TIME / POSSIBLE DINNER

 20:00-23:00

 Collegio Universitario Luciano Fonda (Via Fabio Severo, 40)

GAME NIGHT

Social activity with students from Collegio Fonda: they will talk about physicist Luciano Fonda.

The evening will proceed with board games (quantum games) and some fun quizzes about physics and Trieste!



WEDNESDAY 17/09

🕒 9:00-12:30

GUIDED TOUR OF THE CITY

🕒 12:30-14:00

FREE LUNCH

🕒 14:30-18:30

📍 Department of Physics (Via Alfonso Valerio, 2)

SEMINARS

You'll attend 5 conferences of 30 minutes each. The seminars will cover topics such as: the history of Quantum Mechanics; Physics of Complex Systems; High Performance Computing - Big Data - Machine Learning; Interdisciplinary Electronic and Advanced Sensor Laboratory.

Soon you'll find out more about our speakers and seminars' abstracts!

- 14:30-16:30
 - **"A brief overview of merging binary neutron stars"** by Prof. Luciano Rezzolla
I will discuss how neutron-star binaries represent fantastic tools to explore fundamental aspects of gravitational and particle physics. In particular, I will provide a few examples of the ways in which neutron stars can be used to explore fundamental physics, ranging from their spectral properties, the possibility of phase transition to quark matter, and the amplification of super-strong magnetic fields.
 - **"Solid-state detectors for experimental physics"** by Prof. Laura Gonella
The talk will introduce the role of solid-state detectors in High-Energy Physics (HEP) experiments and neighbouring scientific fields. The key components and technological challenges involved in developing silicon detectors for such applications will be discussed, with focus on the tracking detectors used in HEP experiments. Examples will include innovative developments for next-generation, high-precision experiments—such as the ALICE upgrades and the ePIC detector. Finally, the talk will present the advanced facilities being established at the Department of Physics of the University of Trieste, part of the Department of Excellence initiative, which aim to enhance



interdisciplinary detector development, and support advanced teaching in the field of instrumentation in the various curricula of the Master's Degree in Physics.

- **“Second law of thermodynamics and Fluctuation Theorems”** by Prof. Alberto Imparato
*In microscopic systems in contact with external baths the size of the thermal fluctuations can be as large as the average system energy.
Thus, as an example, microscopic engines are not simple rescaled versions of their macroscopic counterparts, and a statistical thermodynamic description is needed, if one wants to characterize properly the relevant thermodynamical quantities.
In this respect stochastic thermodynamics provides a framework for extending the notions of classical thermodynamic quantities such as work, heat and entropy to the level of individual trajectories for microscopic systems both at equilibrium and out-of-equilibrium.
In this framework work, heat and entropy become fluctuating quantities, and the fluctuation theorems describe the constraints on such fluctuations, extending the second law of thermodynamics to microscopic out-of-equilibrium systems.*

In my lecture I will review the recent extension of the second law to the microscopic realm and discuss a few examples of microscopic out-of-equilibrium systems.

- 16:30-17:30 Coffee break
- 17:30-18:00
 - **“Quantum computing with atoms”** by Dott. Matteo Marinelli
*Quantum computers hold the promise of solving problems that are intractable with classical resources, and atoms—nature’s ideal qubits—are at the forefront of this revolution.
In this talk, we will explore how individual atoms can be isolated, manipulated, and entangled to perform quantum computations. I will introduce the main experimental platforms based on neutral atoms and trapped ions, highlighting the physics that enables precise qubit control, logic operations, and scalability. We’ll also take a look inside the lab: what does a quantum computer built from atoms actually look like? From optical tweezers and ultra-high vacuum chambers to laser systems and control electronics, I’ll guide you through the key components and challenges of this cutting-edge technology. Finally, we will discuss the future directions and open*



questions on the path toward building large-scale, fault-tolerant quantum machines.

- 18:00-18:30
 - **“100 Years of Quantum Mechanics: A History of Understanding What Cannot Be Seen”** by Prof. Angelo Bassi
This talk traces the extraordinary journey of quantum mechanics over the past century, from the earliest atomic models to the profound conceptual revolutions that reshaped our understanding of reality. Beginning with Dalton's atomic hypothesis and culminating in Schrödinger's wave mechanics, the presentation highlights the progressive realization that matter exhibits both particle and wave-like behaviors. It then explores the deep philosophical and physical implications of quantum theory, focusing on the Einstein-Podolsky-Rosen paradox and Bell's theorem, culminating in the experimental confirmation of quantum nonlocality. The final part of the talk addresses modern quantum technologies—including quantum computing, communication, and sensing—emphasizing how the fragility of quantum states is being harnessed for transformative technological applications. As we celebrate the International Year of Quantum in 2025, this retrospective not only honors a century of discovery but also looks ahead to a quantum-enabled future.

 18:30-20:00

DINNER AT THE UNIVERSITY'S CAFETERIA

Private transportation provided

 20:00-22:30

 INAF-OATS (SS14 Località Basovizza, 302)

VISIT OF THE ASTRONOMICAL OBSERVATORY OF TRIESTE

You will have the opportunity to visit Margherita Hack's Specola, where the famous astrophysicist and science popularizer worked. The observatory is located in a rural area of Trieste (Basovizza), where light pollution is lower, allowing for better star observation.

Private transportation provided, it will take you back to your accommodation



THURSDAY 18/09

🕒 9:00-13:00

📍 SISSA (Via Bonomea, 265)

VISITING SISSA (Scuola Internazionale Superiore di Studi Avanzati)

Private transportation provided

You will have the chance to visit one of the research centers founded by the Triestin physicist Paolo Budinich.

The structure of the visit is the following:

- Discussion Game - How open is open access?
 - During this interactive session, participants will explore their opinions, engage in discussions, and make collective decisions on open access publishing.
 - This game has been developed by SISSA Medialab, the SISSA in-house company active in scholarly publishing and science communication.
- Coffee break
- Presentation of SISSA's physics research branches

🕒 13:00-13:30

LUNCH AT SISSA

Private transportation provided

🕒 14:00-16:00

📍 Padriciano

VISITING INFN AND AREA SCIENCE PARK

Private transportation provided

🕒 16:45-18:45

📍 Basovizza

VISITING ELETTRA SINCROTRONE AND CNR

🕒 19:00-20:00

BUFFET

Private transportation provided to go to each accommodation



FRIDAY 19/09

🕒 9:00-11:30

📍 INAF-OATS (Via Giambattista Tiepolo, 11)

CONFERENCES

You will have the chance to discover what kind of research a physicist can do at INAF.

- Fabrizio Fiore: *Astrophysics in Trieste and astrophysics from space*
- Andrea Zacchei: *Technological projects at Osservatorio Astronomico di Trieste*
- Laura Silva: *Stellar Astrophysics at OATs*
- Fabio Fontanot: *Extragalactic Astrophysics at OATs*

🕒 12:30-14:00

LUNCH AT ICTP

🕒 14:00-16:30

📍 ICTP (Str. Costiera, 11)

VISITING ICTP

You will have the opportunity to visit the International Centre for Theoretical Physics, founded by Paolo Budinich and Abdus Salam in 1964.

The structure of the visit is the following:

- 14:00-15:00 Presentation of ICTP History
- 15:00-16:00 Seminar
- 16:00-16:30 “The Link Between Research and Innovation: A Lesson From the History of Physics” by PhD student Pierluigi Masai

The speaker will talk about his own educational journey and the testimonies of the people he has met, using them as a starting point to briefly illustrate the richness of the Trieste ecosystem, outlining its historical development. The talk aims to encourage critical reflection on the dynamics of the research world, highlighting the importance of recognizing the structural elements that shape, constrain, and enable it. By acknowledging the role of science in society, the session seeks to spark interest in the foundations and ethics of research. In particular, it will emphasize the importance of studying the history of research and the need to deconstruct its myths.

🕒 16:30-18:30

Coffee break and the possibility to join us to discover **Miramare Castle**.



 20:00-23:00

 Caffè degli Specchi (Piazza Unità d'Italia, 7)

SOCIAL DINNER

SATURDAY 20/09

 10:00-12:00

 Collegio Universitario Luciano Fonda (Via Fabio Valerio, 40)

CLOSING CEREMONY

- 10:00-12:00 poster session
- 12:00-12:30 farewell

