

MISSION

The Niels Bohr International Academy (NBIA) is an independent center of excellence hosted by the Niels Bohr Institute. Our mission is to attract the best and the brightest to Denmark and provide the environment to enable breakthrough research in the physical sciences and mathematics, such as astroparticle physics, biophysics, condensed matter, quantum devices, particle physics, cosmology, and theoretical astrophysics.

MEMBERS

The NBIA staff includes several Professors, some of which hold prestigious positions as Villum Kann Rasmussen and Niels Bohr Professorships. A significant number of NBIA Assistant Professors and Associate Professors have started new research groups in their disciplines by attracting prestigious national and European grants. The NBIA hosts a large number of post-docs, PhD-students, and MSc-students. We have a steady stream of international visitors, who are invited to give seminars or collaborate with NBIA members.

ACTIVITIES

The NBIA hosts around ten workshops, symposia and PhD-schools every year. We also reach out to the public with a number of activities, including an annual series of public lectures in collaboration with the Danish Open University. All in all the NBIA offers an incredible stimulating environment for students!

CONTACT INFORMATION

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THE NIELS BOHR INTERNATIONAL ACADEMY



The NBIA invites prospective MSc students to an informal event

"MSc Projects @ NBIA"

on October 13, 2021

Join us to learn more about our diverse research program and the possibilities to carry out your MSc project at NBIA.

For registration and further information please visit:

www.nbia.nbi.ku.dk/mscday2021



The Niels Bohr
International Academy

NEUTRINO ASTROPHYSICS

These are exciting times for neutrino astrophysicists, with the IceCube telescope paving the way for a new neutrino astronomy era. The prime focus of the NBIA neutrino astrophysics group is to shed light on the role of neutrinos in astrophysical environments, such as core-collapse supernovae and gamma-ray bursts, by adopting neutrinos to learn about the source properties. This new group has recently joined ongoing local efforts in astroparticle physics, aiming to place the NBIA at the forefront of an exciting and rapidly developing field.

THEORETICAL ASTROPHYSICS

This line of research at the NBIA spans a variety of topics, using a broad range of theoretical techniques and numerical tools. Topics of interest include: accretion flows around young stars and compact objects, the formation of black hole binary systems and subsequent mergers, the interstellar medium, the intergalactic medium in galaxy clusters, as well as the early evolution of our solar system and exoplanetary systems. We have access to powerful computer resources and interact on a daily basis with the Computational Astrophysics Group at the NBI.

CONDENSED MATTER THEORY

The condensed matter theory group at the NBIA seeks to understand how to create, control, measure, and protect quantum coherence and entanglement in quantum many-body systems. This is crucial for building large controlled interacting quantum devices, such as solid-state qubits, nanowires and nanotubes. We maintain close links with the Center for Quantum Devices, with many opportunities for theory-experiment collaborations on these fundamental topics.

THEORETICAL PARTICLE PHYSICS

The search for the most fundamental interactions in Nature probes the shortest distances ever reached. Right now, a major impact comes from the experimental front, in particular from CERN, the LIGO and VIRGO gravitational wave observations, from neutrino experiments, and, remarkably, from cosmology. In the theoretical particle physics group at the NBIA we explore all these frontiers and have a strong focus on modern amplitude calculations, including understanding General Relativity from scattering amplitudes.

ASTROPARTICLE PHYSICS & COSMOLOGY

The research carried out in this field by the group at the NBIA is at the boundary between fundamental physics and astrophysics/cosmology, investigating the origin of the matter-anti-matter asymmetry of the universe, the nature of the dark matter (and of dark energy), the generation of the primordial fluctuations which seeded large-scale structure, and the sources and propagation of high energy cosmic radiation - charged particles, gamma-rays and neutrinos. An exciting new type of messenger augmenting this research are gravitational waves.

BIOPHYSICS & ACTIVE MATTER

NBIA has recently launched an exciting new initiative to expand into soft matter physics and the hot topic of active, self-organizing matter: bacterial colonies, cellular tissues, or filaments inside living cells. A distinctive feature of these active materials is their ability to autonomously create coherent flows with the entire material moving as a unit. Such coherent flows of cells occur in vital biological processes - from wound healing and organ formation to bacterial invasion and tumor progression - and are the subject of intense studies due to their potential for medical intervention.