Joint Symposium of the Danish and German Physical Societies (SYDK)

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One of the epicenters of the early development of quantum physics was Copenhagen. This happened because Niels Bohr in 1921 defined the new Institute of Theoretical Physics as an international hub and invited the brightest minds of the time to visit and enjoyed long- and short-term positions in Copenhagen. In this symposium, we will have lectures recalling the special history and the special flavor of quantum physics as it was developed and discussed in Copenhagen in the 1920'es, and we will have research talks reporting on modern scientific research from some of the many strong collaborations that have always united scientists in Denmark and Germany.

Overview of Invited Talks and Sessions

(Lecture hall ZHG008)

Invited Talks

SYDK 1.1	Mon	10:45–11:25	ZHG008	**Quantum physics and the spirit of Copenhagen** — •Klaus Molmer
SYDK 1.2	Mon	11:25–12:05	ZHG008	**General Relativity from Quantum Theory** — •Niels Emil J. Bjerrum-Bohr
SYDK 1.3	Mon	12:05–12:45	ZHG008	**Frontiers in quantum gravity** — •Astrid Eichhorn

Sessions

SYDK 1.1–1.3	Mon	10:45–12:45	ZHG008	**Joint Symposium of the Danish and German Physical Societies**

SYDK 1: Joint Symposium of the Danish and German Physical Societies

Time: Monday 10:45–12:45 Location: ZHG008

Invited Talk SYDK 1.1 Mon 10:45 ZHG008
Quantum physics and the spirit of Copenhagen — •Klaus Molmer — Niels Bohr Institute, University of Copenhagen, Denmark

With his 1913 theory model of atoms and molecules, Niels Bohr joined Planck and Einstein as co-founder of the early quantum theory. In 1920, he was given the opportunity to lead the new institute in Copenhagen, that now carries his name, and he designed it as a modern and progressive hub for a whole generation of young scientists from all over the world. Bohr's own model of atoms turned out to be insufficient, while a new theory, quantum mechanics, was spearheaded by Heisenberg and Schrödinger in 1925-26.

The seminar will recall the appearance at the Niels Bohr institute of central international figures in the development of quantum theory, and how many elements of the new theory and its interpretation were centerpiece of discussions in Copenhagen. A bust of Albert Einstein in Bohr's office in Copenhagen, reminds the visitor that today's pursuit of quantum computers and other quantum technologies borrows elements and inspiration from the famous discussions between Bohr and Einstein.

Invited Talk SYDK 1.2 Mon 11:25 ZHG008
General Relativity from Quantum Theory — •Niels Emil J. Bjerrum-Bohr — Niels Bohr Institute, Copenhagen

Gravity is an elemental theory of physics, but its exact quantum mechanical nature remains a mystery. A significant breakthrough is that we can now directly measure the effects of massive black holes colliding in the Universe through gravitational waves. This exciting development has opened up possibilities for intriguing comparisons between measurements of gravitational interactions and theoretical expectations. In this talk, I will describe how to derive results for observables in classical gravity using quantum field theory by applying the Bohr correspondence principle. This approach provides new insights into the fundamental nature of gravitational interactions and could potentially reveal deviations from Einstein's theory of general relativity.

Invited Talk SYDK 1.3 Mon 12:05 ZHG008
Frontiers in quantum gravity — •Astrid Eichhorn — Institute for Theoretical Physics, Heidelberg University, Heidelberg

After decades of research, understanding the quantum structure of spacetime remains an open challenge. I will provide an overview of that challenge and some recent progress, highlighting two aspects: First, I will contrast different candidate theories of quantum gravity and discuss whether or not they are related to each other. Second, I will discuss the challenge of connecting theories of quantum gravity to observational data and review ideas how to address this challenge.