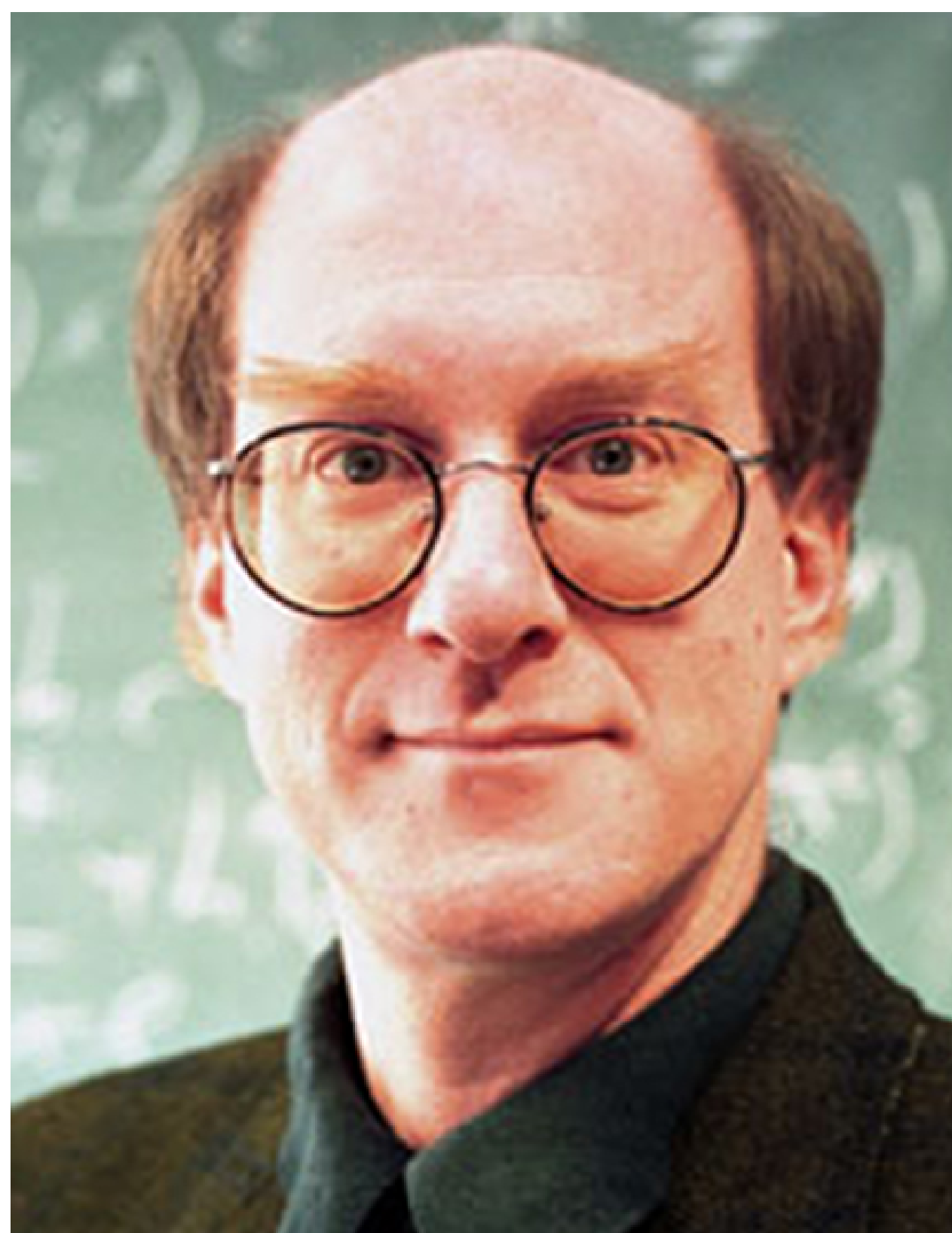


**NOVEMBER 22nd / 3 p.m. /**

**III Wing Lecture Hall / Ruđer Bošković Institute, Bijenička 54, Zagreb**



## **Prof. Dr. Dieter Lüst**

LMU & MPI for Physics  
Munich

# **Quantum Aspects of Black Holes**

Although there is direct experimental evidence for the existence of black holes from the recent measurements of gravitational waves, black holes are still mysterious objects from the theoretical point of view. According to the seminal work of Stephen Hawking, all information about the collapsing matter that forms a black hole is lost during the evaporation of Hawking radiation. This loss of information is in sharp conflict with the rules of quantum mechanics. It is also closely related to the no hair theorem of classical black holes, which states a black hole cannot carry any other quantum numbers other than its mass, charge or its angular momentum. Hence it is mandatory to understand in a quantum theory of gravity what are the carriers of information in a black hole and which kind of quantum hair can be attributed to black holes.

In this talk, prof. Lüst will first review how the quantum entropy of black holes emerges in string theory. Furthermore he will also discuss a complementary picture for the hair of neutral Schwarzschild black holes. This part is based on some recent developments related to asymptotic symmetries in gravity. Finally he will give some remarks on the quantum structure of space time and black holes as quantum computers.

**Professor Dr. Dieter Lüst** is full professor and Chair of Mathematical Physics at Ludwig Maximilians University of Munich since 2004 and director of Max-Planck Institute for Physics in Munich. He finished his PhD at LMU in Munich, was postdoctoral researcher at Caltech, CERN, and MPI Munich. From 1993 till 2003 he was Chair of Quantum Field Theory at Humboldt University in Berlin. His research focusses on string theory. He published more than 300 papers with more than 15000 citation, and co-authored two textbooks on string theory and one popular book. In 2012 he was awarded ERC-Advanced Grant "Fundamental Aspects of Strings and Gravity". He serves as Editor in Chief of "Fortschritte der Physik", as a member of the Editorial boards of two more journals (JHEP, CQG), and as a member of of EC-ERC Panel and EC-Marie-Curie Panel. For his work he received number of awards and in particular in 2000, he received the Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft, which is the highest honour awarded in German research.



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