IQ ST | INTEGRATED QUANTUM SCIENCE AND TECHNOLOGY

Universität Stuttgart | universität ulm

Invitation to IQST Seminar

on Thursday, July 14th, 2022 at 10 am
Universität Ulm
Albert-Einstein-Allee 11
N24/252

H. Vincent Poor

Princeton University

Entanglement-assisted Concatenated Quantum Codes

Abstract: Code concatenation that uses two or more short component codes is a significant method for designing powerful error correcting codes. Concatenated classical codes are not only good in theory, but also have been widely used in practice. However, constructions of concatenated quantum codes (CQCs) do not enjoy these same advantages. This talk considers the introduction of entanglement to concatenated codes to produce entanglement-assisted CQCs (EACQCs). It is seen that the enhanced performance of EACQCs under noisy ebit conditions demonstrates considerable advantages in both quantum communication and quantum computation. Among them, it is shown that EACQCs can beat the best-known quantum codes, either standard or entanglement-assisted.

Bio: H. Vincent Poor is the Michael Henry Strater University Professor at Princeton University. where his interests include information theory, machine learning and network science, and their applications in a variety of fields. During 2006-16, he also served as Dean of Princeton's School of Engineering and Applied Science, and he has held visiting positions at a number of other universities, including most recently at Berkeley, Cambridge and Texas A&M. He is a member of the U.S National Academy of Engineering and the U.S. National Academy of Sciences, and he is a foreign member of the Royal Society and other national academies. He received the IEEE Alexander Graham Bell Medal in 2017, and he has been recognized with honorary doctorates and professorships from multiple universities in Asia, Europe and North America.

Host: Prof. Dr. Wolfgang Schleich, Institut für Quantenphysik, Universität Ulm