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AULA ROSTAGNI
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DESY GERMAN ELECTRON SYNCHROTRON

Quantum computing: a future perspective for scientific computing

Abstract: Quantum computing is a novel and promising way to solve problems that are extremely hard or even impossible to address with classical computers.
We will discuss applications of quantum computations particularly for high energy physics but also beyond as carried out at the Center for Quantum Technologies and Applications at DESY in Zeuthen.
In the talk the focus will be on lattice quantum electrodynamics (QED) in 1+1 and 2+1 dimensions. In the 1+1-dimensional Schwinger model the CP violating phase transition in presence of an external electric field is discussed.
In 2+1-dimensional QED the “running" coupling and a way to determine the non-perturbative Lambda-parameter through a combination of Monte Carlo and Quantum simulations will be addressed.

Karl Jansen is the head of the Center of Quantum Technology and Applications (CQTA) at DESY Zeuthen in Germany and an ERA Chair holder at the Cyprus Institute in Cyprus. He is a world leading expert in quantum computing and has combined his expertise and knowledge in this field by developing new avenues in quantum computing for lattice field theory, quantum machine learning for particle track reconstruction in high energy physics detectors and also quantum art.

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