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UNIVERSITÀ
DI TRENTO

Dipartimento di
Fisica

Dott. Sebastian Schmitt

Honda Research Institute Europe HRI-EU

Thursday, 26 October 2023: 14:00

Room A108, Via Sommarive 5

BEC seminar: Solving realistic application problems with quantum algorithms

Abstract

Quantum technology has greatly matured in recent years and various quantum computing hardware platforms are nowadays available to end users. Currently, a very active and important research topic addresses how this technology could be utilized for solving realistic application problems relevant to industry. Apart from necessary but more technological challenges like scaling the number of qubits and developing efficient quantum error correction schemes, there still exist fundamental algorithmic challenges as well. Real-world problems are typically equipped with many constraints which restrict the space of feasible solutions considerably. Also, typical engineering problems need to consider multiple, mostly conflicting objectives, like cost and quality of a product. State-of-the-art quantum optimization approaches are currently not well suited to treat constraints efficiently, and multiple objectives cannot be addressed at all.

In this talk we will present current state of the art approaches to constraints in quantum optimization algorithms, and briefly show novel approaches to handle constraints much more efficiently. We will also present recent ideas to handling multiple objectives in quantum algorithms. Both developments enable the treatment of realistic optimization problems, like the optimization of charging schedules of electric vehicles.

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