Seminar Series on Quantum Computing

Hybrid Variational Algorithms for Classical and Quantum Complex Systems

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Abstract:

Quantum Computing is seen as a potential breakthrough for the study of hard classical problems as well as for quantum many body systems. However, we are in the era of NISQ devices and still far away from fault-tolerant machines. This leads us to consider the possibility of hybrid classical-quantum protocols of variational type: they exploit quantum resources to efficiently prepare states that depend on a suitable chosen set of variational parameters, which can then be determined by means of optimization algorithms to be run on a classical computer. The choice of such classical optimizer schemes is to be guided by compatibility requirements with respect to current available quantum platforms. To evaluate the feasibility of such an approach, we present different applications of the Quantum Approximate Optimization Algorithm to both classical and quantum systems implemented by means of emulations of the full protocol on a classical hardware as well as a case study that has been run on a real Rydberg atom quantum machine.

Venue: **Sala Galilei (room 131, ground floor, Bldg C)**
Time: **Monday, 11/03/2024, 17:00**