EDK | ECT*
FONDAZIONE BRUNO KESSLER
EUROPEAN CENTRE FOR THEORETICAL STUDIES IN NUCLEAR PHYSICS AND RELATED AREAS

ENHANCING QUBIT READOUT WITH AUTOENCODERS

May 26, 2023 at 15:15
Piero LUCHI | UNITN, ECT* and INFN-TIFPA

The realization of a computer that exploits quantum - rather than classical - principles represents a formidable scientific and technological challenge. Today, superconducting quantum processors are achieving significant results in simulation and computation capabilities. However, the realization of a fault-tolerant quantum device still poses many technical difficulties. Among the many, the ability to perform high fidelity qubit readout, to actually extract information from the device, is of primary importance. In the dispersive readout technique, the qubit is coupled to a readout resonator and its state is inferred by measuring the quadrature amplitudes of an electromagnetic field transmitted through the resonator. However, random thermal noise in the hardware, gate errors or qubit decay processes occurring during the measurements can reduce the readout fidelity. Appropriate statistical models or more complex machine learning techniques can help to restore good fidelity. A novel semi-unsupervised machine learning classification method based on autoencoder pre-training is presented and compared with state-of-the-art techniques.

General information:
This is our last appointment for the spring season. To celebrate we invite you all to have an aperitif in the terrace of the villa with some music. See you in September!

To reach Villa Tambosi:
Take bus number 13 from Povo (one leaves around 15) or bus number 6 from the city center. The bus stops is in front of the Villa.

In order to organize the aperitif we kindly ask you to confirm your presence through the google form that you can find scanning the following QR code:

Contacts: agnech@ectstar.eu - morresi@ectstar.eu - cconstantinou@ectstar.eu

www.ectstar.eu