Contribution ID: **4** Type: **Contribution from scientific community**

DEMETRA: DEcoherence Mitigation through EnvironmenTal Radioactivity Abatement

Superconducting circuits are emerging as leading candidates for qubits as they offer fast gate times and high fidelity, and because of their simple design and fabrication. The current limit of superconducting circuits is their poor coherence time. This value, today on the order of hundreds of μs, should be improved to a few milliseconds for an efficient quantum processor.
The DEMETRA project, funded by an INFN starting grant, tackles a too-long neglected source of decoherence: radioactivity. Cosmic rays, but also the decay products of the radioactive contaminations in the laboratory environment, can release energy in the qubit destroying its coherence. Radioactivity can also limit the potential of quantum error correction, which relies on the assumption that the qubits deposited on the same substrate are not affected by correlated errors. In this contribution we present the first measurements preformed operating superconducting circuits in the underground Laboratories of Gran Sasso.

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