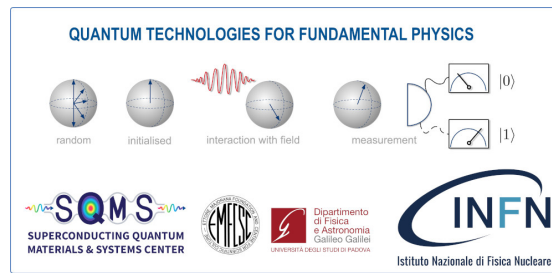


Quantum Technologies for Fundamental Physics



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Cryogenic test runs in preparation for NLQM searches

Tuesday, September 5, 2023 9:50 AM (25 minutes)

“Following the ideas in [1] and [2] we are building an experiment for searching for the quantum mechanics non-linearity signal

at the cryogenic cavity vertical test facility at Fermilab. The experiment will employ quantum bit sequence generated

on “Aspen-M”80-qubit quantum computer at Rigetti Computing, Inc [3]. The novelty of this experiment lies in using cryogenic temperature setup which would

allow to suppress background noise. The experiment will be run in an automated way by a computer that communicates with the several devices needed in the experiment.

The experimenter’s involvement in running the experiment is only launching the execution of the script the runs the experiment in an automated way from start to end.

This was approach was chosen to avoid a problem of quantum dilution [1]. So far a test run was run was conducted using classically generated bits rather than quantumly generated.

Details of the test run will be described.

[1] <https://arxiv.org/pdf/2106.10576.pdf>

[2] arXiv:2204.11875 (2022)

[3] <https://www.rigetti.com/>”

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