



Contribution ID: 545

Type: **Parallel talk**

## Studying Correlated Errors in Superconducting Qubits Underground in NEXUS

*Monday 28 August 2023 18:00 (15 minutes)*

Recent work indicates that nonequilibrium quasiparticles can contribute to decoherence effects in superconducting qubits. Ionizing radiation, for example, has been shown to create space- and time-correlated errors in qubit arrays. For quantum computing, such correlated errors can create problems for standard error correcting codes. For quantum sensing, these same phenomena represent a source of background error. We present preliminary work with an array of weakly charge-sensitive superconducting qubits, in a low-background test stand 100 meters (225 m.w.e.) underground at Fermilab's MINOS experimental area. Combined with measurements at the Earth's surface, this suite of underground, low-background measurements will help to quantify the effects of quasiparticle burst events in qubit arrays. Furthermore, these studies will inform the design of the new Quantum Science Center (QSC) underground quantum facility at Fermilab, QUIET.

### Submitted on behalf of a Collaboration?

No

**Authors:** BAXTER, Daniel (Fermi National Accelerator Laboratory, USA); BRATRUD, Grace (Northwestern University)

**Presenter:** BRATRUD, Grace (Northwestern University)

**Session Classification:** Dark matter and its detection

**Track Classification:** Dark matter and its detection