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The BeEST Experiment: A Search for keV-Scale Neutrinos in the EC Decay of 7Be with Superconducting Quantum Sensors[1] KYLE LEACH, Colorado School of Mines, BEEST COLLABORATION — The search for sterile neutrinos is among the brightest possibilities in our quest for understanding the microscopic nature of dark matter in our universe. Sterile neutrinos - unlike the active neutrinos in the SM - do not couple to left-handed currents in the weak interaction, and are thus best observed via their mass-generated effects that result from momentum conservation with SM particles. One way to observe these momentum recoil effects experimentally is through high-precision measurements of electron-capture (EC) nuclear decay, where the final state only contains the neutrino and a recoiling atom. This approach is among the most powerful methods for BSM neutrino mass searches since it relies only on the existence of a heavy neutrino admixture to the active neutrinos, which is a generic feature of neutrino mass mechanisms, and not on the model-dependent details of their interactions. In this talk, we report the first measurements in the Beryllium EC STJ (BeEST) experimental program, which uses the decay-momentum reconstruction technique to precisely measure the ^{7}Be$\rightarrow^{7}$Li recoil spectrum via ^{7}Be ions implanted into sensitive superconducting tunnel junction (STJ) radiation detectors.

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Kyle Leach
Colorado School of Mines

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