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Alpha line detection with Nb based and YBCO based superconducting resonators

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For high-energy particle detection, we investigated two materials: niobium and a high-temperature superconductor, $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$. Lumped element kinetic inductance detectors are fabricated with the both superconductors. The both devices detected the alpha line (5.4 MeV) radiated from ^{241}Am source at 1 K. The energy resolution of the Nb-base detectors was approximately 0.6 MeV and independent from the power of the read-out signal, although the decay time strongly depends on the microwave power and vary from 6-2 μs . The duration of alpha line signals with the YBCO-resonators were less than 0.1 μs due to relatively low quality factor (4000-7000) and very fast quasiparticle life time.

Less than 5 years of experience since completion of Ph.D

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