



Contribution ID: 321

Type: **Talk**

【437】 Testing quantum mechanics with heavy objects – using magnetically-levitated superconducting microparticles

Wednesday, 1 September 2021 18:30 (15 minutes)

It is unclear how our classical world emerges from the quantum world. It is also unclear how to incorporate effects of gravity into quantum mechanics. To get experimental insights into these problems, we need to prepare larger masses in quantum states.

Magnetically-levitated superconducting microparticles make promising systems for doing this. We work with a lead microsphere of $\sim 10^{-18}$ amu ($\sim 1 \mu\text{g}$) which we isolate from its surroundings using magnetic levitation. We read out the sphere's COM motion using a SQUID and cool the motion by applying additional magnetic fields. We will extend our control by coupling the sphere's motion to superconducting resonators and qubits.

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Session Classification: Atomic Physics and Quantum Optics

Track Classification: Atomic Physics and Quantum Optics