中央大學物理學系

Department of Physics, National Central University

Colloquium

Improving Coherence Time of Superconducting Qubits

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Date: 2024/01/02 (Tue)
Venue: S4-625
Time: 14:00-16:00

Abstract:
In recent years, superconducting quantum circuits have emerged as promising candidates for quantum processors with tunable parameters.
Despite their potential, the coherence time of superconducting qubits is significantly hindered by strong coupling to the environment. This limitation poses a challenge for their widespread application in quantum information science. To address this issue, two primary strategies have been employed: decoupling qubit transitions from the environment and minimizing environmental noise sources. In this presentation, I will delve into the enhancement of coherence times by designing a new type of superconducting qubit known as Fluxonium qubits, aimed at mitigating environmental influences. Additionally, I will explore how advancements in materials, fabrication processes, and measurement setups contribute to the suppression of environmental noise. The talk will also showcase our ongoing work involving the design, fabrication, and measurement of Fluxonium qubits, coupled with high-quality microstrip resonators exhibiting a high internal quality factor due to superior materials. By combining these innovative techniques, we aim to outline a roadmap toward achieving high-coherence qubits. This presentation will provide insights into the intricate interplay between hardware design, materials, and measurement methodologies in advancing the field of superconducting quantum circuits for practical quantum information processing.