



陳永富 副教授

Yung-Fu Chen Associate Professor

Dept. of Physics, NCU

Development and Application of Josephson Parametric Amplifiers

Date: 2023/03/07 (Tue)

Venue: S4-625

Time: 14:00-16:00

Abstract:

Amplification is necessary for measuring small-amplitude electrical signals. Although an amplifier can provide the required amplification, it also adds extra noise to the amplified signal and degrades the signal-to-noise ratio (SNR). A Josephson parametric amplifier (JPA), incorporating a resonator made of Josephson junctions to allow parametric modulation, can offer high gain in microwave frequencies with nearly quantum-limited noise performance to boost measurement SNR.

Recent demands in measuring ultraweak microwave signals from superconducting circuits for quantum information applications have driven intensive development of JPAs. In this presentation, I will discuss the working principle, design considerations, and device performance of JPAs. I will also describe their applications in superconducting qubit readout and axion dark matter search in our group.