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2024 Spring Meeting of the APS Eastern Great Lakes Section
Friday–Saturday, April 12–13, 2024; Kettering University, Flint, Michigan

Session E01: Poster Session (4:30 pm - 6:30 pm ET)
4:30 PM, Friday, April 12, 2024
Kettering University Room: Asahi Kasei Traverse

Abstract: E01.00005 : Unlocking the Future of Phi-bits: Advancing Quantum-Inspired Computing*

← Abstract →

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Understanding the control of phi-bits, akin to qubits, is crucial for developing quantum-inspired computing. Phi-bits, or two states of an acoustic wave in coupled waveguides, can be in a superposition of states. Our experiments showed that external drivers' frequency, amplitude, and phase influence phi-bit states. We developed a discrete element model to predict phi-bit responses under varying nonlinear conditions, influenced by the intrinsic medium coupling the waveguides and external factors like signal generators and transducers. The study reveals that nonlinearity and damping significantly affect the amplitude and phase of phi-bit states, with a notable impact on their predictability and stability, particularly at high damping levels. These findings are crucial to manipulating phi-bits for quantum-inspired information processing, highlighting the importance of optimizing nonlinearity and damping to control phi-bit states.

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