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## Electromagnetically induced transparency in circuit quantum electrodynamics with nested polariton states

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In this presentation, we report the observation of Electromagnetically induced transparency (EIT) in a superconducting circuit system using strictly single-photon processes and polariton states in the nesting regime. EIT originates from quantum interference in an atomic three-level system. To achieve this, we first drive the dressed cavity-qubit states of a two-dimensional circuit QED system. This generates a set of polariton states. With proper tuning, we achieve the nesting regime, defined by the regime where the first two levels of the Jaynes-Cummings ladder bracket the drive frequency. The lowest three energy levels of the polariton states are utilized to form the $\Lambda$-type system. EIT is observed and verified by Akaike's information criterion based testing. Negative group velocities up to $-0.52\pm0.09$~km/s are obtained based on the dispersion relation in the EIT transmission spectrum. This results in a versatile, on-chip quantum-optics platform using tunable polaritons.

### Biography

David P Pappas is a Research (project leader) at NIST including quantum bit coherence improvements and magnetic sensors. He has his research interest in the area of quantum computing. Dr. David Pappas has over 75 publications.

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