

Waveguide QED with photons and phonons

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In this talk, I'll discuss the physics of microwave photons moving in a coplanar waveguide (1D transmission line) interacting with an artificial atom. I'll also discuss the difference between scattering in an open transmission line and when the atom is situated in front of a mirror. Furthermore, I'll discuss what happens when the microwave photons are replaced by surface acoustic wave (SAW) phonons. The phonon velocity is five orders of magnitude slower, implying that the atom is now substantially larger than the wavelength for its spontaneous emission. This results in a strongly frequency dependent coupling between the atom and the waveguide and a unique non-exponential decay dynamics of the atom.