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While microwave solid state qubits have demonstrated very efficient quantum protocols over the years, their fragile quantum states have yet been trapped at the bottom of cryostats. On the other hand, optical fibers can transport a quantum state over kilometers without losing its salient features.

At the Center for Hybrid Quantum Networks, we are developing a platform to transduce quantum information from microwave to optics by coupling an ultracoherent mechanical resonator to both an optical and a microwave cavity. This technology could enable the development of a large scale hybrid network, coined “quantum internet”, where each node would be a different cryostat.