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Addressing cavity finesse degradation in ion-cavity systems TAILIN WU, MOLU SHI, ISAAC CHUANG, Massachusetts Inst of Tech-MIT — High finesse optical cavities are an essential part for achieving strong coupling between single ions and single photons, which offers a strong experimental platform in the pursuit of efficient light-matter interactions. However, degradation of cavity finesse has been repeatedly observed in ultra-high vacuum (UHV) systems, especially in the blue and ultraviolet part of the spectrum. One hypothesis attributes this finesse degradation to oxygen depletion from the mirror top layer coating. We have investigated this decay behavior of optical cavities of different top layer coatings, with resonance at 422nm in UHV conditions. In this talk, I will present our studies of finesse decay with and without baking, and recovery in oxygen at different temperature settings.

Tailin Wu
Massachusetts Inst of Tech-MIT

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