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**A SRF niobium cylindrical cavity with a large silicon nitride niobium-coated membrane as one end-wall** LUIS MARTINEZ, ALESSANDRO CASTELLI, JACOB PATE, JOHNATHON THOMPSON, WILLIAM DELMAS, JAY SHARPING, RAYMOND CHIAO, Univ of California - Merced, CHIAO TEAM, SHARPING TEAM — The development of large silicon nitride membranes and niobium film deposition techniques motivate new architectures in optomechanics and microwave devices that can exploit the extremely high Q's obtainable with superconducting radio frequency (SRF) niobium cavities. We present a X-band SRF cylindrical cavity-membrane system in which one end-wall of the cavity is replaced by a niobium coated centimeter-sized silicon nitride membrane. We report moderately high Q factors above 10 million. Experimental results characterizing the system and potential future applications for such schemes in microwave devices and optomechanics are discussed.

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