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Optomechanics with ripples on superfluid helium GERWIN KOOLSTRA, DAVID MCKAY, GE YANG, University of Chicago, DAVID CZAPLEWSKI, Argonne National Laboratory, Center for Nanoscale Materials, DAVID SCHUSTER, University of Chicago — Superfluid helium has arisen as a promising candidate for optomechanics systems. Due to extremely low loss well below the lambda point, vibrations on the helium – ripples – are expected to have high quality factors [1]. Here we report on progress towards coupling microwave photons in a superconducting LC resonator to ripples in SU8 microchannels. In our device, ripples ($\omega_m/2\pi \approx 0.5$ MHz) can be generated using interdigitated transducers and detected using superconducting resonators. We estimate the coupling of our device on the order of 5 kHz per nm of ripple wave amplitude. In this talk, we will discuss our experiments probing the properties of ripples and thermal vibrations of the helium. [1] P. Roche et al., Phys. Rev. Lett. 75, 3316 (1995)

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