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**Scintillation yield from electronic and nuclear recoils in superfluid helium-4** JUNSONG LIN, ETHAN BERNARD, MADELINE BERNSTEIN, ANDREAS BIEKERT, DANIEL MCKINSEY, ROGER ROMANI, RYAN SMITH, BURKHANT SUERFU, VETRI VELAN, LANQING YUAN, University of California Berkeley, SCOTT KRAVITZ, Lawrence Berkeley National Laboratory, SCOTT HERTEL, PRATYUSH PATEL, DOUGLAS PINCKNEY, ALESSANDRO SERAFIN, University of Massachusetts Amherst, HERALD COLLABORATION — Superfluid He-4 is a promising target material for direct detection of light (<1 GeV) dark matter. Signal channels for dark matter - nucleus interactions in superfluid He include prompt photons, triplet excimers, rotons and phonons, but measurement of these signal strengths have yet to be performed for low energy nuclear recoils. A measurement of the prompt scintillation yield from electronic and nuclear recoils was carried out in superfluid He-4 at 1.75 Kelvin, with deposited energy in the range of 10-1000 keV. The scintillation from a 16 $cm^3$ volume of superfluid He-4, with tetraphenyl butadiene as wavelength shifter deposited on thin quartz panels, was read out by six R8520-06 MOD PMTs immersed in the superfluid, each individually biased by a Cockcroft-Walton generator. Elastic scattering of 2.8 MeV neutrons (generated by a deuterium-deuterium neutron generator) from superfluid He-4, with a liquid organic scintillator module used as far-side detector, was used to determine the scintillation signal yield for a variety of nuclear recoil energies. For comparison, Compton scattering of Cs-137 gamma-rays with the superfluid He-4, with NaI scintillators used as far-side detectors, was used to determine the scintillation signal yield of electronic recoils.

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