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Single Crystal Superconducting Bolometric Photon Detector¹ KEVIN INDERHEES, PAUL WELANDER, JAMES ECKSTEIN, Department of Physics and F Seitz Materials Research Laboratory, University of Illinois, Urbana — We have studied bolometric photon detectors made from 10 nm thick single crystal niobium films grown by MBE. The films are atomically flat, have transition temperatures above 7.5 K and residual resistivity ratios >10, and can be patterned with uniform cross section, since they are not granular. The critical current density at 4.2 K is greater than 2×10^7 A/cm². The films are patterned into links between 300 and 500 nm wide. As a function of bias current, the detectivity is sharply peaked near the critical current, which appears to increase the sensitivity. The detected voltage signal has been studied at low frequency so far (~1MHz), and is linearly dependent on the photon flux. The fact that relatively wide links provide good detectivity is due to the uniform superconducting transport properties of the single crystal niobium.

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