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Quantum efficiency of an InAs/GaSb type-II superlattice photodiode[1] SHIN MOU, JIAN LI[2], SHUN LIEN CHUANG, University of Illinois at Urbana-Champaign, UNIVERSITY OF ILLINOIS TEAM — We present the experimentally measured and theoretically modeled quantum efficiency of an n-on-p InAs/GaSb superlattice photodiode with a cutoff wavelength of 7.5 microns. The model is based on an analytical photocurrent solution with all the parameters obtained by measurements. For instance, the optical absorption coefficient was obtained from transmission measurements and the transport parameters were obtained from electron beam induced current (EBIC) experiments. With an absorptive layer 1.15 micrometer thick, we show the space charge region contributes most of the photocurrent for this specific structure. We found a design consisting of a ternary InAs/InGaSb superlattice absorptive region with an improved absorption coefficient gives us 50 % larger external quantum efficiency with a similar cutoff wavelength. This shows that engineering the quantum structure could optimize the quantum efficiency.

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