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Adaptive quantum well/dot IR photodetector with modulated optical bias ANDREI SERGEEV, KIMBERLY SABLON, U.S. Army Research Laboratory, Adelphi, MD 20783, USA — Low doping of optical nanostructures leads to a weak electron coupling to radiation, because the radiation is absorbed due to electron transitions in nanoblocks (quantum wells and dots). High doping levels strongly enhance the absorption, but lead to high dark current and high noise current. This tradeoff is inevitable in traditional detector design and with conventional operating regimes, because the radiation absorption and dark current are both proportional to the number of electrons in nanoblocks. To overcome limitations related to the tradeoff between IR absorption and dark current, we propose and study the "nonequilibrium" IR quantum well or quantum dot photodetectors with modulated optical bias. Here we present design of the detector and results of modelling of key detector characteristics, such as responsivity, operating time, and noise equivalent power.

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