

Multi-gigahertz operation of photon counting InGaAs avalanche photodiodes

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We report a 2 GHz operation of InGaAs avalanche photodiodes for efficient single photon detection at telecom wavelengths. Employing a self-differencing circuit that incorporates tuneability in both frequency and arm balancing, extremely weak avalanches can now be sensed so as to suppress afterpulsing. The afterpulse probability is characterized as 4.84% and 1.42% for a photon detection efficiency of 23.5% and 11.8%, respectively. The device will further increase the secure bit rate for fiber wavelength quantum key distribution.

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