Author Correction: Multistep staircase avalanche photodiodes with extremely low noise and deterministic amplification

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In the originally published version of this article, we reported measurements of the gain of 1-, 2- and 3-step staircase avalanche photodiodes (APDs). These APDs achieved the first experimental confirmation of 2^N gain scaling with the number of staircase steps, N. We also characterized their noise properties. The original noise measurements used an Agilent N8973A calibrated noise figure meter. While this approach has proved successful for previous measurements of the excess noise of APDs, for the staircase APDs, the minimum measurement frequency of the noise figure meter was higher than the APD bandwidth, which was limited by charge trapping. This resulted in an underestimate of the noise power spectral density, shown in Figure 5b. We have repeated the noise power measurements at low frequency (70 kHz) using an Agilent E4440A spectrum analyzer. These measurements show that the average gain for the 2-step at −2.5 V is 4.01, with an average excess noise factor of 1.02. The average gain for the 3-step at −4 V is 7.24, with an average excess noise factor of 1.08. Both values agree well with those presented in Figure 5a of the original manuscript, which were determined from the gain data, and are much lower than the excess noise of a best-case $k = 0$ conventional APD. The low-frequency noise measurements confirm the theoretical predictions of near-unity excess noise factors of staircase APDs. The original and revised versions of Figure 5b are shown as Figure 1 below.

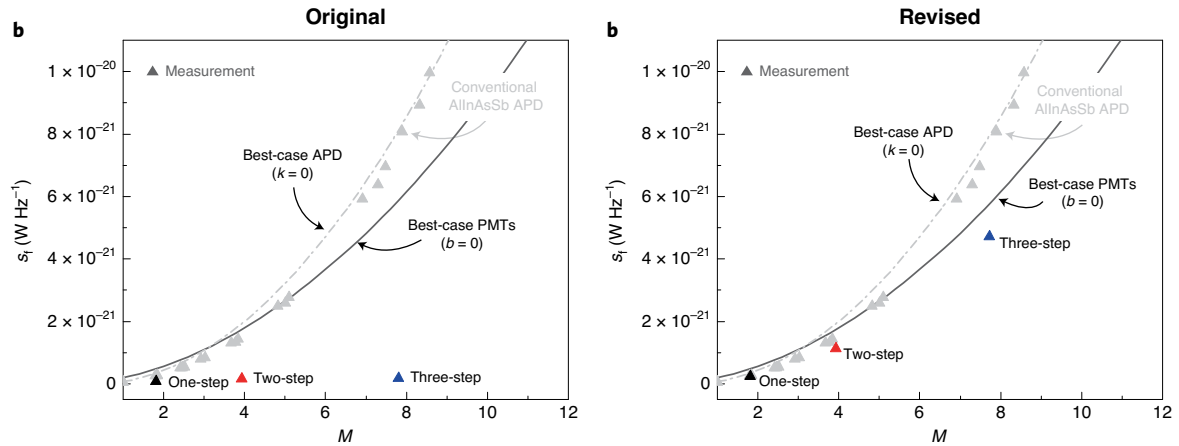

Fig. 1 | Original and revised Figure 5b.