Erratum: On-chip microwave-to-optical quantum coherent converter based on a superconducting resonator coupled to an electro-optic microresonator [Phys. Rev. A **94, 053815 (2016)]**

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In our article, we discuss the noise associated with the conversion of a microwave signal to an optical frequency. We realized that the discussion of the noise surrounding Eq. (9) is insufficiently clear and misleading. It may lead the reader to conclude that the ideal converter adds noise. This is, in fact, not the case.

The expression n_{eq} represents the *total* output noise of the conversion process that is divided by the conversion efficiency γ in order to refer to the input of the device and not the *added* noise as could be understood from the last sentence of the paragraph. It therefore includes a contribution from the vacuum fluctuations in the input signal. Moreover, two important assumptions are not explicitly stated. First, we consider the microwave input mode to be in a thermal state with noise temperature $\bar{n}_{\text{el,th}}$, identical to the noise temperature of the internal thermal bath of the microwave cavity. Second, the noise spectrum is given as a symmetrized noise spectrum defined as $S(\omega) = \int_{-\infty}^{\infty} dt e^{i\omega t} \{[a_{\text{out}}(t)]^\dagger a_{\text{out}}(0) + a_{\text{out}}(0)[a_{\text{out}}(t)]^\dagger\}$, where a_{out} represents the mode leaving the optical cavity without the normalizing factor $1/2$ that is often introduced (yielding a noise of the form $2n + 1$ instead of $n + 1/2$, where n is the bosonic occupancy).

For completeness, we give here the expression of the added noise $n_{\text{added}} = \frac{\kappa_b}{\kappa_b^{(\text{ex})}} \left(\frac{(1+\mathcal{C})^2}{4\mathcal{C}} \frac{\kappa_a}{\kappa_a^{(\text{ex})}} - 1 \right) + \frac{\kappa_b^{(\text{in})}}{\kappa_b^{(\text{ex})}} (2\bar{n}_{\text{el,th}} + 1)$. This is equivalent to Eq. (9) of our original article with the noise associated with the input microwave port subtracted. We note that the added noise vanishes in the limit of overcoupled microwave and optical cavities ($\kappa_b^{(\text{ex})} \rightarrow \kappa_b$, $\kappa_a^{(\text{ex})} \rightarrow \kappa_a$) and unity cooperativity ($\mathcal{C} \rightarrow 1$) when the conversion is fully quantum coherent.