Erratum to "Towards Ultrasensitive SQUIDs Based on Submicrometer-Sized Josephson Junctions"

Jan-Hendrik Storm, Oliver Kieler, and Rainer Körber

This details corrections to [1], which were provided as a proof by the authors prior to publication but not reflected in the published version.

From Section I, paragraph 1: All instances in the text of Planck's constant should appear as *h*. Therefore,

> Superconducting quantum interference devices (SQUIDs) are the most sensitive detector for magnetic flux, and state-of-the-art PTB current sensor SQUIDs reach a coupled energy sensitivity of about 30 *h* when operated at 4.2 K (h is Planck's constant).

is corrected to:

> Superconducting quantum interference devices (SQUIDs) are the most sensitive detector for magnetic flux, and state-of-the-art PTB current sensor SQUIDs reach a coupled energy sensitivity of about 30 *h* when operated at 4.2 K (*h* is Planck's constant).

From Section I, paragraph 2:

> For an uncoupled dc SQUID of inductance L_{SQ}, critical current I_{c}, shunt resistance R_{N}, and junction capacitance C, the design parameters $\beta_c = 2\pi I_{\mathrm{c}} R_N^2 C/\Phi_0$ and $\beta_L = 2L_{\mathrm{SQ}} I_{\mathrm{c}}/\Phi_0$ are chosen close to 1 for optimal noise performance.

is corrected as follows:

> For an uncoupled dc SQUID of inductance L_{SQ}, critical current I_{c}, shunt resistance R, and junction capacitance C, the design parameters $\beta_{\mathrm{c}} = 2\pi I_{\mathrm{c}} R^2 C/\Phi_0$ and $\beta_L = 2L_{\mathrm{SQ}} I_{\mathrm{c}}/\Phi_0$ are chosen close to 1 for optimal noise performance.

From Section II-B, last sentence:

> The gap voltage V_g is determined at $I_{\mathrm{c,IV}}$ and the subgap resistance R_{S} at 2 mV.

is corrected as follows:

> The gap voltage V_{g} is determined at $I_{\mathrm{c,IV}}$ and the subgap resistance R_{S} at 2 mV. R_{N} is the normal resistance.

From Section III-A, paragraph 1:

> These have square junctions with side lengths of 0.8 μm and differ in their R_{N}.

is corrected as follows:

> These have square junctions with side lengths of 0.8 μm and differ in their R.

From Section III-A, paragraph 2:

> I_c was calculated from the bias current needed for maximum voltage and we obtained a mean (eight devices) of 6.2 μA with a standard deviation of 0.5 μA for a single JJ.

is corrected as follows:

> I_{c} was calculated from the bias current needed for maximum voltage and we obtained a mean (eight devices) of 6.2 μA with a standard deviation of 0.5 μA for a single JJ.

From Section III-B, equation (1):

$$\varepsilon_{\mathrm{th}} \approx 2\,(1+\beta_L)\,\Phi_0 k_{\mathrm{B}} T/I_{\mathrm{c}} R_{\mathrm{N}}$$

is corrected as follows:

$$\varepsilon_{\mathrm{th}} \approx 2\,(1+\beta_L)\,\Phi_0 k_{\mathrm{B}} T/I_{\mathrm{c}} R$$

Fig. 3 and Tables I and II are also corrected as follows.

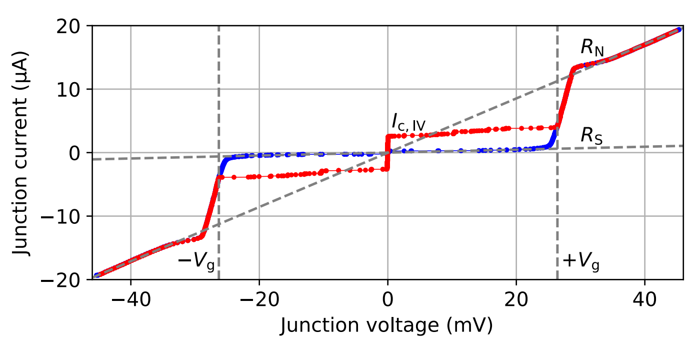

Fig. 3. *I–V* curve of the (0.8 × 0.8) μm^2 junction array consisting of 10 JJs at 4.2 K. Division of the abscissa by ten gives V_{g} for a single junction.

TABLE I
PARAMETERS OF THE SUBMICRON JUNCTIONS AT 4.2 K

JJ length (μm)	I_{c} (μA)	$I_{\mathrm{c,IV}}$ (μA)	V_{g} (mV)	R_{N} (Ω)	R_{S} (kΩ)	$R_{\mathrm{S}}/R_{\mathrm{N}}$
0.8	6.40[a]	3.36	2.63	234	4.79	20.5
0.7	4.90[a]	2.34	2.63	299	6.01	20.0
0.6	3.60[a]	1.64	2.63	397	9.98	25.1

[a]nominal values.

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TABLE II
PARAMETERS OF MINIATURE SQUIDS WITH $L_{\mathrm{SQ}} = 70$ pH AT 4.2 K

#	JJ length (μm)	I_{c} (μA)	C (fF)	R (Ω)	β_c	β_L	ε_{w} (h)	$\varepsilon_{\mathrm{th}}$ (h)
SQ-1	0.8	6.4	40[a]	47	1.7	0.43	4.1[b]	1.7
SQ-2	0.8	6.4	40[a]	34	0.90	0.43	5.3	2.4
	2.5[c]	6.55	400	10	0.80	0.44	27	8.0

[a]estimated from 400 mK data.
[b]mean value.
[c]equivalent square length of octagonal-shaped JJ.

Caption of Fig. 4:

original:

Energy sensitivity of four SQUIDs with $(0.8 \times 0.8)\,\mu\mathrm{m}^2$ (SQ-1: $R_N = 47\,\Omega$, SQ-2: $R_N = 34\,\Omega$) and one SQUID with $(2.5 \times 2.5)\,\mu\mathrm{m}^2$ JJs.

is corrected as follows:

Energy sensitivity of four SQUIDs with $(0.8 \times 0.8)\,\mu\mathrm{m}^2$ (SQ-1: $R = 47\,\Omega$, SQ-2: $R = 34\,\Omega$) and one SQUID with $(2.5 \times 2.5)\,\mu\mathrm{m}^2$ JJs.

REFERENCE

[1] J.-H. Storm, O. Kieler, and R. Körber, "Towards ultrasensitive SQUIDs based on submicrometer-sized Josephson junctions," *IEEE Trans. Appl. Supercond.*, vol. 30, no. 7, Oct. 2020, Art. no. 1600705.