Messprotokoll F98: SQUIDs and Noise Thermometers

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I. Preparations:

Fehler: 1% + 2 digits

Kanal 1 (rot):	$\pm V_1$:	(0.366 ± 0.039) kΩ	8.8 Ω
	$\pm \Phi_{X_1}$:	260.5 Ω	7.2 Ω
Kanal 2 (Grün):	$\pm V_2$:	1.132 kΩ	57.2 Ω
	$\pm \Phi_2$:	0.443 kΩ	7.3 Ω
	$\pm \Phi_{X_2}$:	(70 ± 2) kΩ	32.0 Ω
	$\pm I_2$:	349.5 Ω	7.5 Ω
Kanal 3 (Blau):	$\pm V_3$:	1.13 kΩ	58.4 Ω
	$\pm \Phi_3$:	0.487 kΩ	54.1 Ω
	$\pm \Phi_{X_3}$:	68.7 Ω	7.1 Ω
	$\pm I_3$:	348.7 Ω	7.3 Ω

supraleitend, widerstände für Kabel.

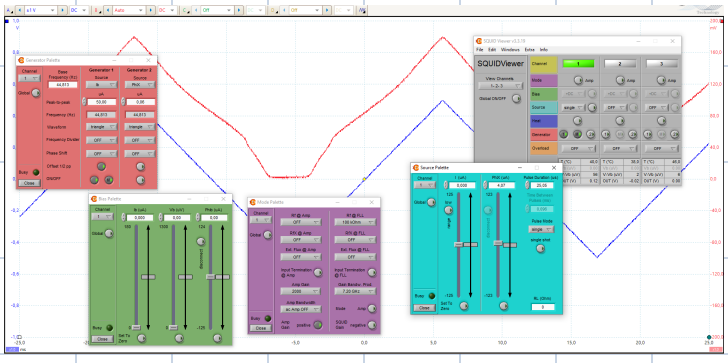
II. Single stage SQUID:

1. Open-Loop

- Nonlinearen Bereich betrachten

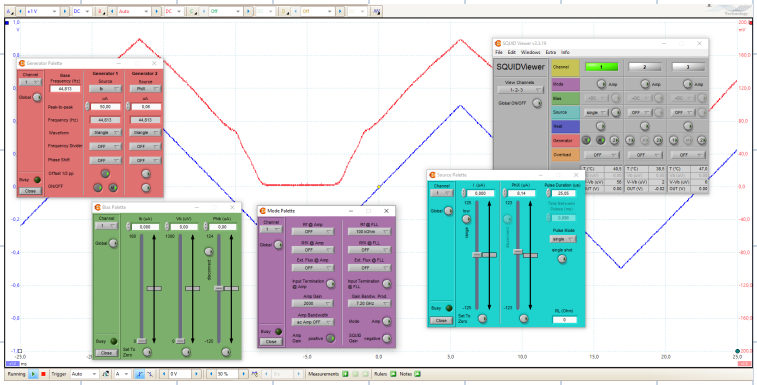
max: PhiX (μA): 4.07, 13.23, 22.39, 30.53, 40.71

min: PhiX (μA): 8.14, 17.30, 26.46, 34.60, 43.76



max

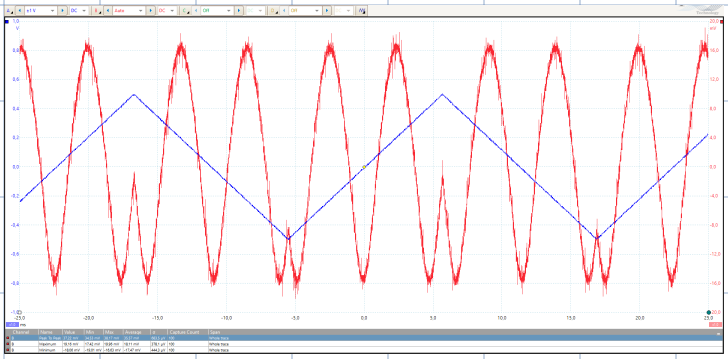
$$\frac{\text{Peak-to-Peak [μA]}}{100}$$



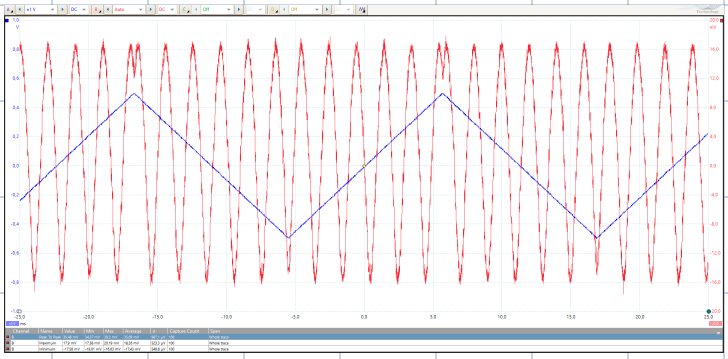
min

- V-Φ: Maximaler Peak-to-Peak Wert suchen.

	I_b [µA]	Peak-to-Peak [µA]
Φ_B/Φ_X	13.4 ± 0.3	199.97

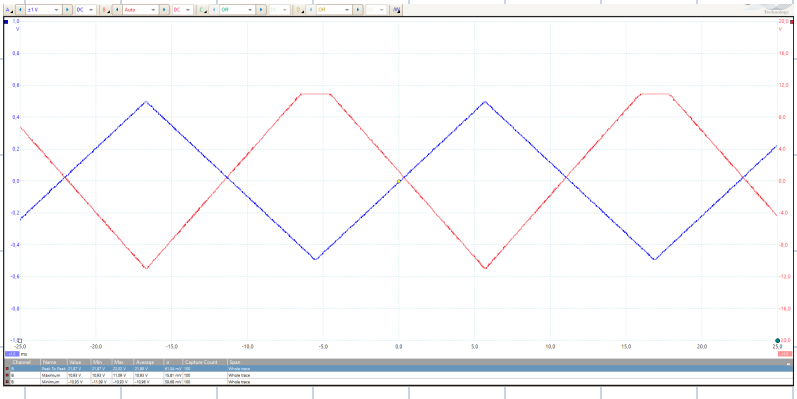


Φ_B



Φ_X

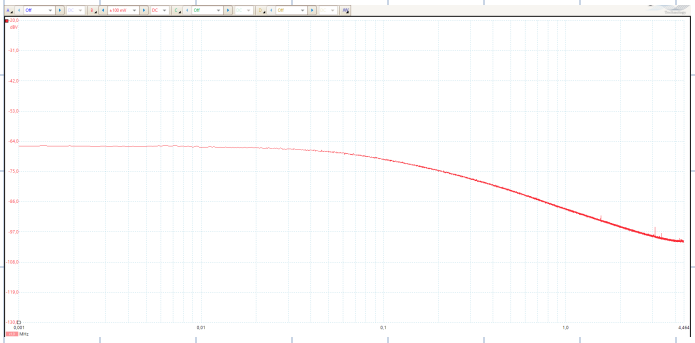
2. Verwenden Flux-Locked-Loop



Peak-to-Peak [µA]
to

- Noise Thermometer (single Stage) (50)

GBP: 7.20 GHz



III. Two-stage SQUID Readout

1. V-Φ characteristic in open loop

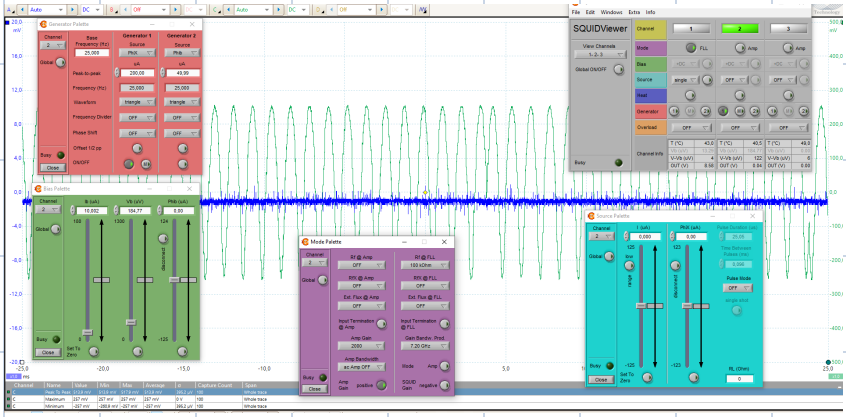
Maximale Spannung Schwingung:

$I_b = (10.0 \pm 0.3)\ \mu A$

$V_b = 184.77\ \mu V$

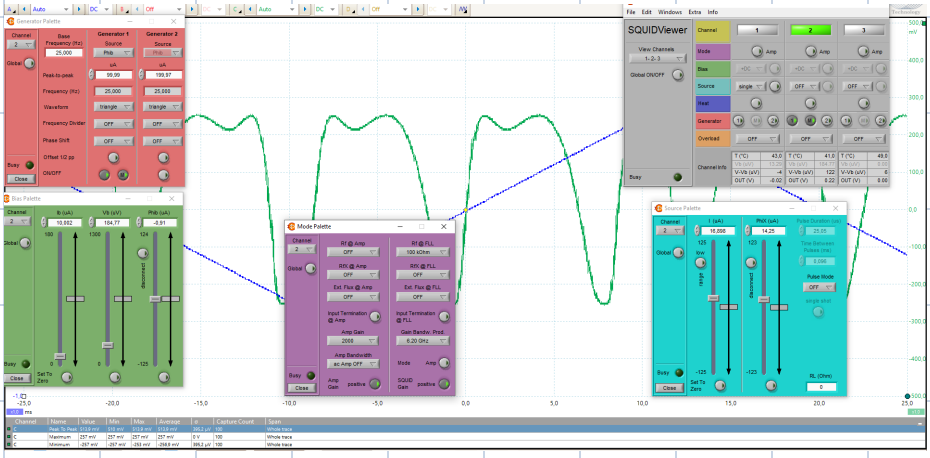
Array (PhiX als Source)

Peak-to-Peak: 200 µA



first stage: $I = (16.9 \pm 0.5)\ \mu A$ Phib als Source

$\Phi_X = (14.2 \pm 0.5)\ \mu A$



2. Noise spectrum

$I_B = -0.91\ \mu A$ bis $V_{out} \approx 0\ V$

GBP: 6.20 GHz