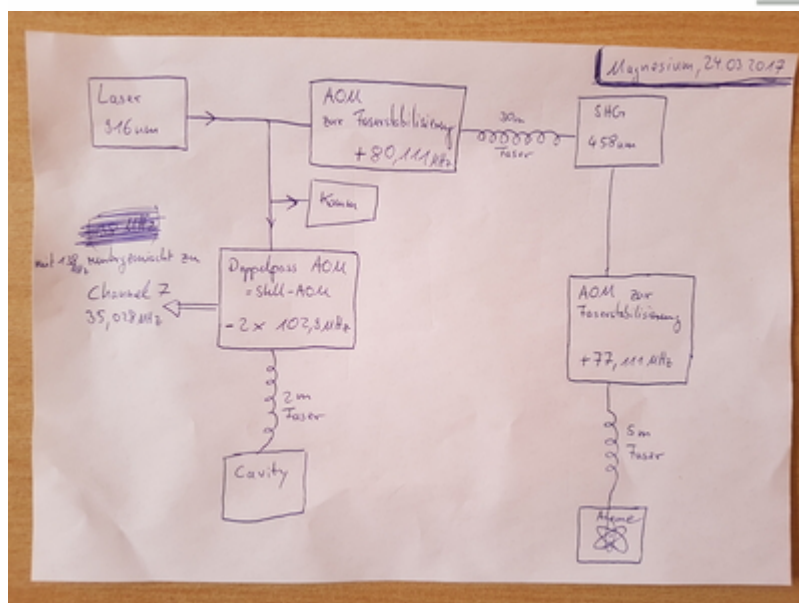
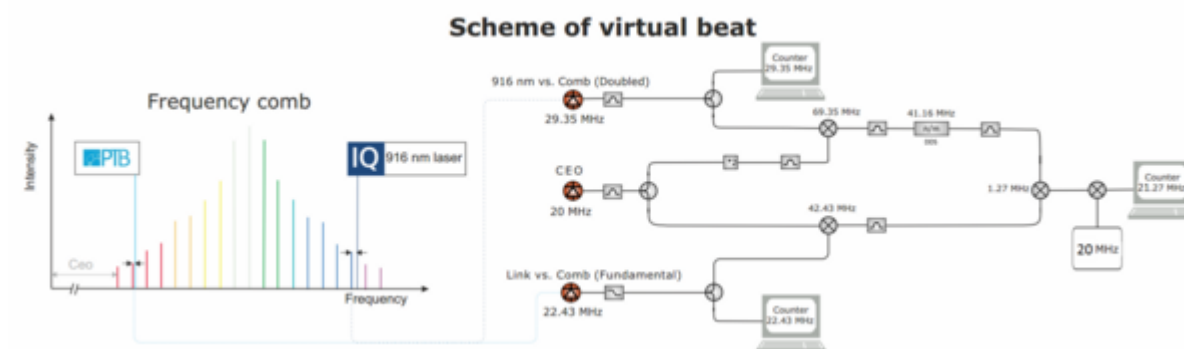


Notes/Informations

Frequency-Comb Hannover

Channel	Measured	Frequency	Sign	Interval	Max outliers (Alarm)	F(x)
CH1	IQ-Resonator (R1) vs. Comb	29.347 MHz	-	± 1 kHz		-fx
CH2	CEO	20 MHz	-	± 2 Hz		-f _{ceo}
CH3	Reprate/16	6.250001 MHz		± 0.002 Hz		f _{rep} /16
CH4	Link vs. Comb	22.432 MHz	-	± 300 Hz		-f _y
CH5	Virtualer Beat (Link vs. IQ-Laser)	21,27143 MHz		± 20 Hz		f _v
CH6	Manypoint-AOM	36 MHz		± 5 Hz		
CH7	Stell-AOM vom IQ-Laser	35.02865 MHz		± 100 kHz		f _{Stell}
CH8	Rubidiumuhr referenziert auf GPS	10 MHz		± 0.002 Hz		

- Modenverhältnis: 1944000/3275292
- Repetitionsrate: 100,0000226 MHz



- AOM (+77.111 MHz) used for atom-lock + fiber stabilization(5m)
- AOM (+80.111 MHz) used for fiber stabilization(30m)
- Double-pass AOM (-2*102,XX MHz) used for spectroscopy (frequency shift), feedback-loop!!!

- Channel 7 = 138 MHz (Synthesizer, referenced by 10 MHz GPS) - Double-pass AOM
- Atom frequency: $\text{nu_opt}(\text{Mg}) = (3275292 \cdot \text{col}(\text{e}) \cdot 16 - 2 \cdot \text{col}(\text{d}) - \text{col}(\text{c}) + 80,111\text{e}6) \cdot 2 + 77,111\text{e}6$
- Laserfrequency: $f_{\text{laser}} = 3275292 \cdot \text{frep} \cdot 16 - 2 \cdot \text{fceo} - f_x$
- Resonator 1 frequency: $f_{\text{R1}} = 3275292 \cdot \text{frep} \cdot 16 - 2 \cdot \text{fceo} - f_x + (-2 \cdot f_{\text{AOM_R1}})$
- Double-pass AOM: $f_{\text{AOM_R1}} = 138 \text{ MHz} - f_{\text{Stell}}$

Virtuel-Beat

- $f_v = (f_y + \text{fceo}) - (f_x + 2 \cdot \text{fceo}) \cdot (1944000/3275292) + (2 \cdot 10 \text{ MHz})$

Evaluation (PTB)

- $f_x = \text{col}(\text{c})$ (#1, negatives f_x)
- $\text{fceo} = \text{col}(\text{d})$ (#2) (negatives fceo)
- $\text{frep} = \text{col}(\text{e})$ (#3, $\text{frep}/16$)

Test analysis

- $\text{nu_opt}(\text{Mg}) - \text{nu}(\text{Mg2015})[\text{Hz}] = \text{nu_opt}(\text{Mg}) - 655058646691000$

→ $\text{nu_opt}(\text{Mg}) - \text{nu}(\text{Mg2015})[\text{Hz}] = (f_{\text{laser}} + 80,111\text{e}6) \cdot 2 + 77,111\text{e}6 - 655058646691000$

Frequency-Comb Braunschweig

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Last update: **2017/03/28 13:39**

