Notes/Informations

Frequency Measurement NEW since 2018

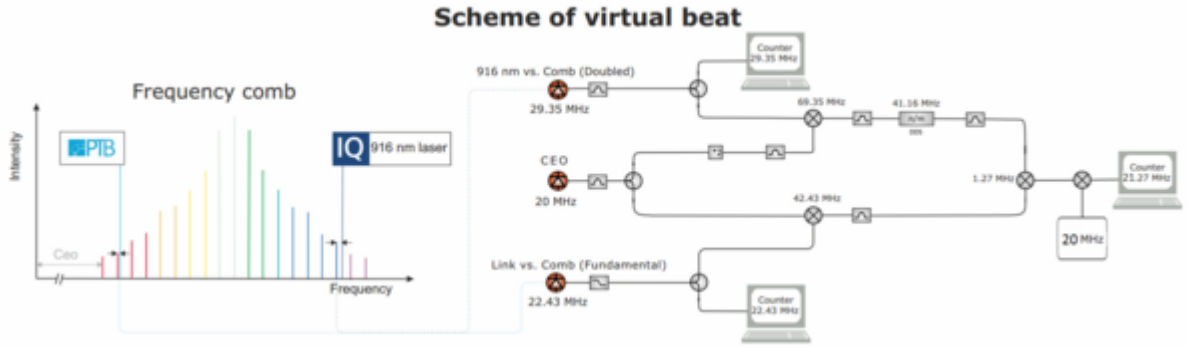
transferbeat_scheme_link_916nm_oktober_2018.pdf

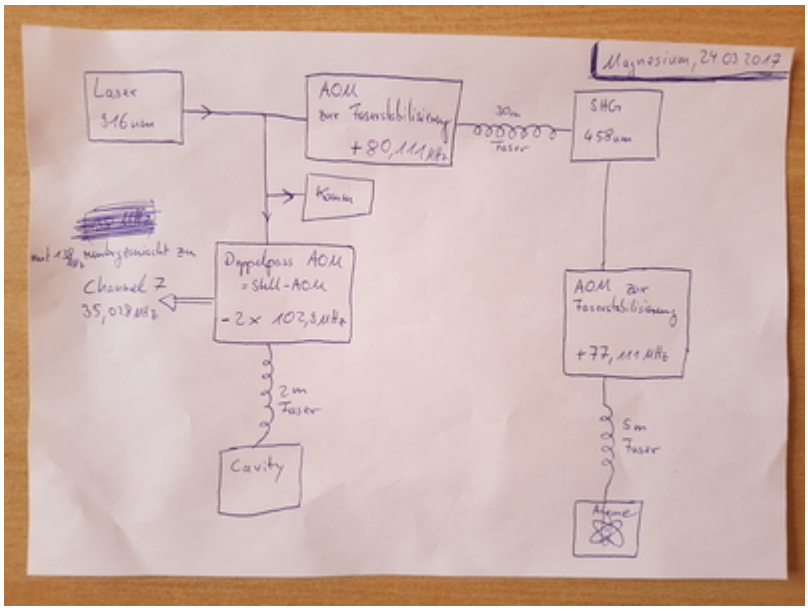
Frequency Measurement 2016/2017

Frequency-Comb Hannover

Channel	Measured	Frequency	Sign	Interval (axis)	Max outliers (Alarmschwelle)	F(x)
CH1	IQ-Resonator (R1) vs. Comb	29.347 MHz	-	± 900 Hz	500 Hz	-fx
CH2	CEO	20 MHz	-	± 0.24 Hz	0.15 Hz	-fceo
CH3	Reprate/16	6.250001 MHz		± 0.0018 Hz	0.001 Hz	frep/16
CH4	Link vs. Comb	22.432 MHz	-	± 900 Hz	500 Hz	-fy
CH5	Virtualer Beat (Link vs. IQ-Laser)	21,27173 MHz		± 18 Hz	10 Hz	fv
CH6	Manypoint-AOM	36 MHz		±18 Hz	10 Hz	
CH7	Stell-AOM vom IQ-Laser	35.0X MHz		± 4000 Hz	2000 Hz (+ correction of Offset)	f_Stell
CH8	Rubidiumuhr referenziert auf GPS	10 MHz		± 0.0018 Hz	0.001 Hz	

- Modenverhältnis: Ratio: N=n916/nLink = 3275292/1944000 = 1.684820987654321...
- 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: nu_opt(Mg = (3275292*col(e)*16 - 2*col(d) - col© + 80,111e6)*2 + 77,111e6
- Laserfrequency: f_laser = 3275292*frep*16 - 2*fceo - fx
- Resonator 1 frequency: f_R1 = 3275292*frep*16 - 2*fceo - fx + (-2*f_AOM_R1)
- Double-pass AOM: f_AOM_R1 = 138 MHz - f_Stell

Virtual-Beat

- fv = (fy + fceo) - ((fx + 2*fceo) / (3275292/1944000)) + (2*10 MHz)

Evaluation (PTB)

- fx= col© (#1, negatives fx)
- fceo=col(d) (#2) (negatives fceo)
- frep=col(e) (#3, frep/16)

Test analysis

- nu_opt(Mg) - nu_(Mg2015)[Hz] = nu_opt(Mg) - 655058646691000

→ nu_opt(Mg) - nu_(Mg2015)[Hz] = (f_laser + 80,111e6)*2 + 77,111e6 - 655058646691000

Frequency-Comb Braunschweig

Clocks hight in respect to the geoid

In front of the university are studs which are used as a reference. In the PDF everything is explained and is given by Dr. Heiner Denker (Institut für Erdvermessung (IFE)), he will also estimate the experiments height with higher precision soon.

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