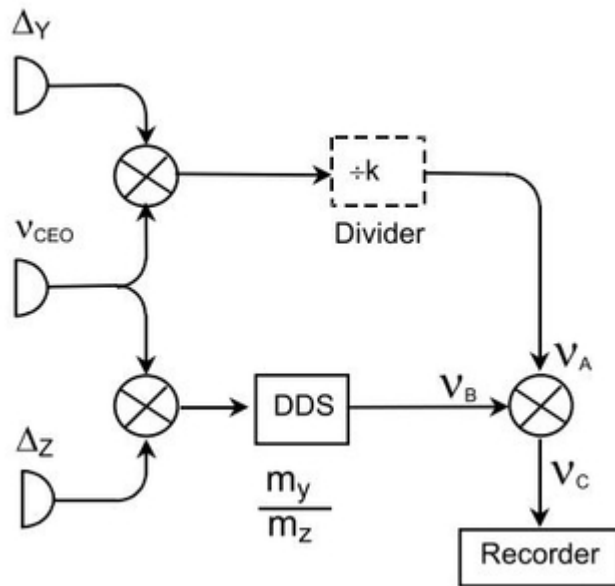


Virtual Beat Measurement

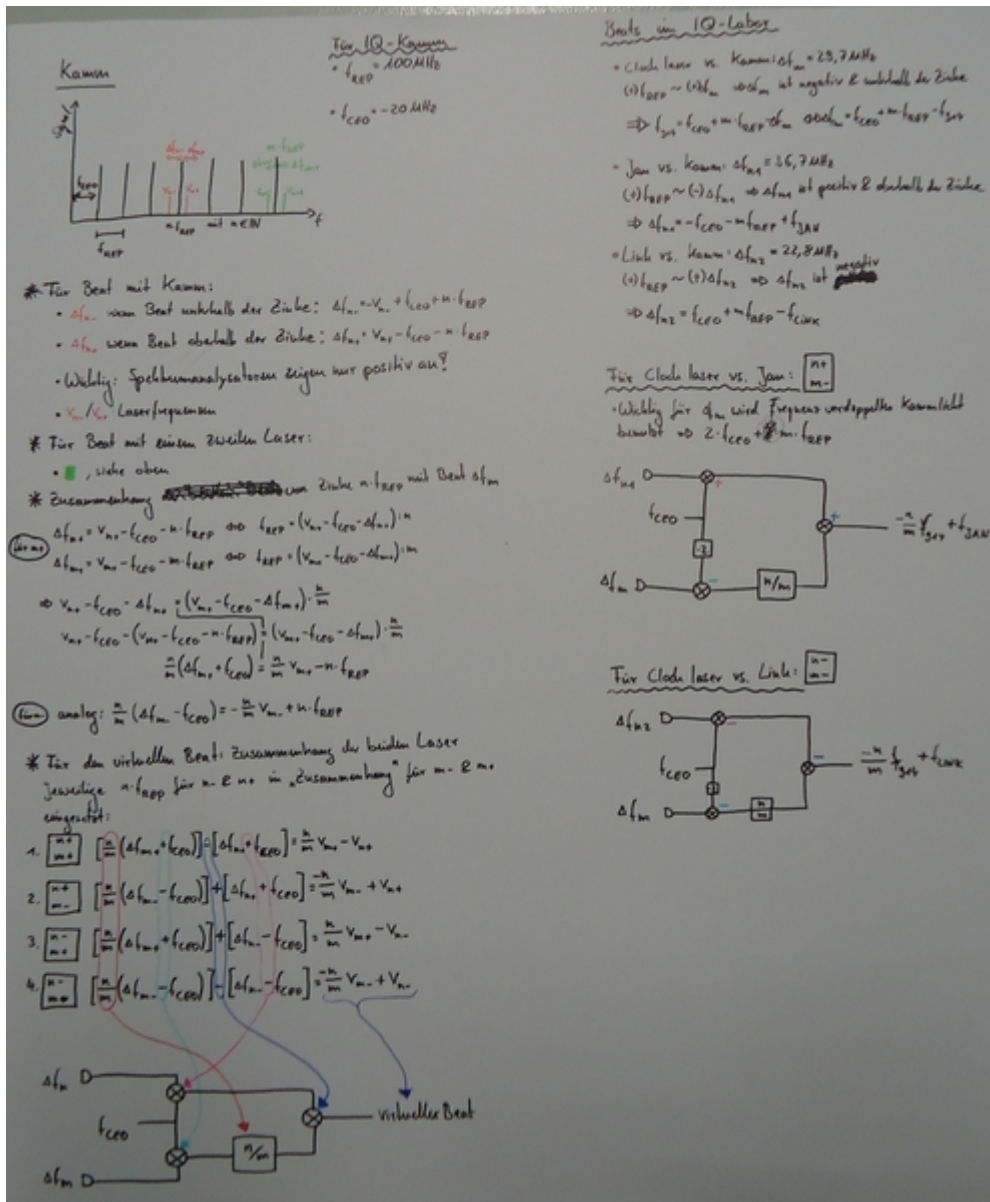
Scheme

Kerr-lens mode-locked lasers as transfer oscillators for optical frequency measurements
 , H. R. Telle et al., arXiv:physics/0107037v1 [physics.optics] (2001)



Theory

Equations for comb:



- For Total Virtual Beat double f_{CEO}
- Compare to Postprocessing Virtual Beat Measurement!
- You find a program, *Virtual Beat*, to simulate the virtual beat under: [\\afs.iqo.uni-hannover.de\projects\magnesium\Mathematica\Kamm](https://afs.iqo.uni-hannover.de/projects/magnesium/Mathematica/Kamm)

Frequencies

- Jan's Laser = 194.401.549 MHz (fine with Protocolbook 194.401.556 MHz).
- 916nm clock laser: 327.5291 THz (accuracy maybe worse than 100 MHz)

Measured with wavemeter in PTB (accuracy: ± 30 MHz):

- 194.400.001 MHz Laser
- -47 MHz Regel-AOM
- +36 MHz Manypoint-extraktion-AOM

→ 194.399.990 MHz

Jan's transportable laser has a higher frequency:

- Mixer in Hannover run with +1515 MHz
- Beat is +44 MHz
- Jan's Laser = 194.401.549 MHz (fine with Protocolbook 194.401.556 MHz)

DDS-Programming

Ratio: $N=n916/nLink = 3275292/1944000 = 1.684820987654321...$

Inverted Ration: $N'=1/N$

For DDS: $M=(N')*2^{48} = 167065212727755.34375$ (dez) = 97f1e6a8b1cb.58 (hex) $\approx$ **97f1e6a8b1cb** (hex)

Alte Berechnung (Es wurden die Frequenzen geteilt und nicht die Modennummern)

1. → ratio of $\sim 1,684807$
2. → 474231011086950,203392
3. [Hex]: 1AF4F82F51266
4. → Inverted Ratio: 0,5935397770762964267907798116259
5. $0,5935397770762964267907798116259 * 2^{48} = 167066594929398,49071775301797611$
6. 167066594929398 [Deg] entspricht 97F2390B6AF6 [Hex]

→ Type 97F2390B6AF6 into the divider!!!

Three corner head measurement

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