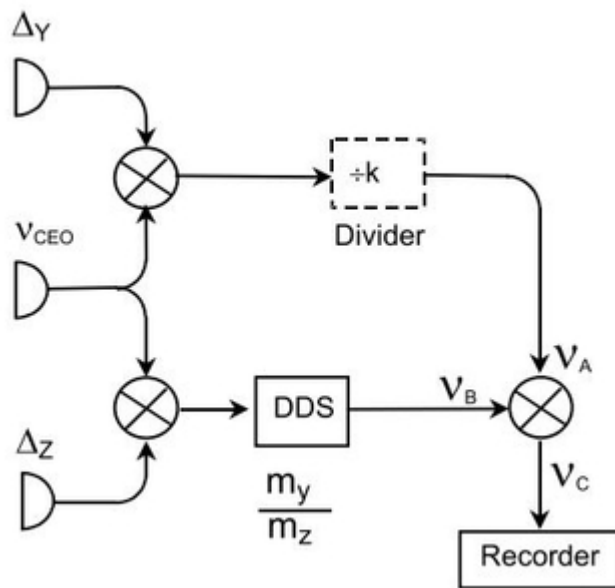


Virtual Beat Measurement

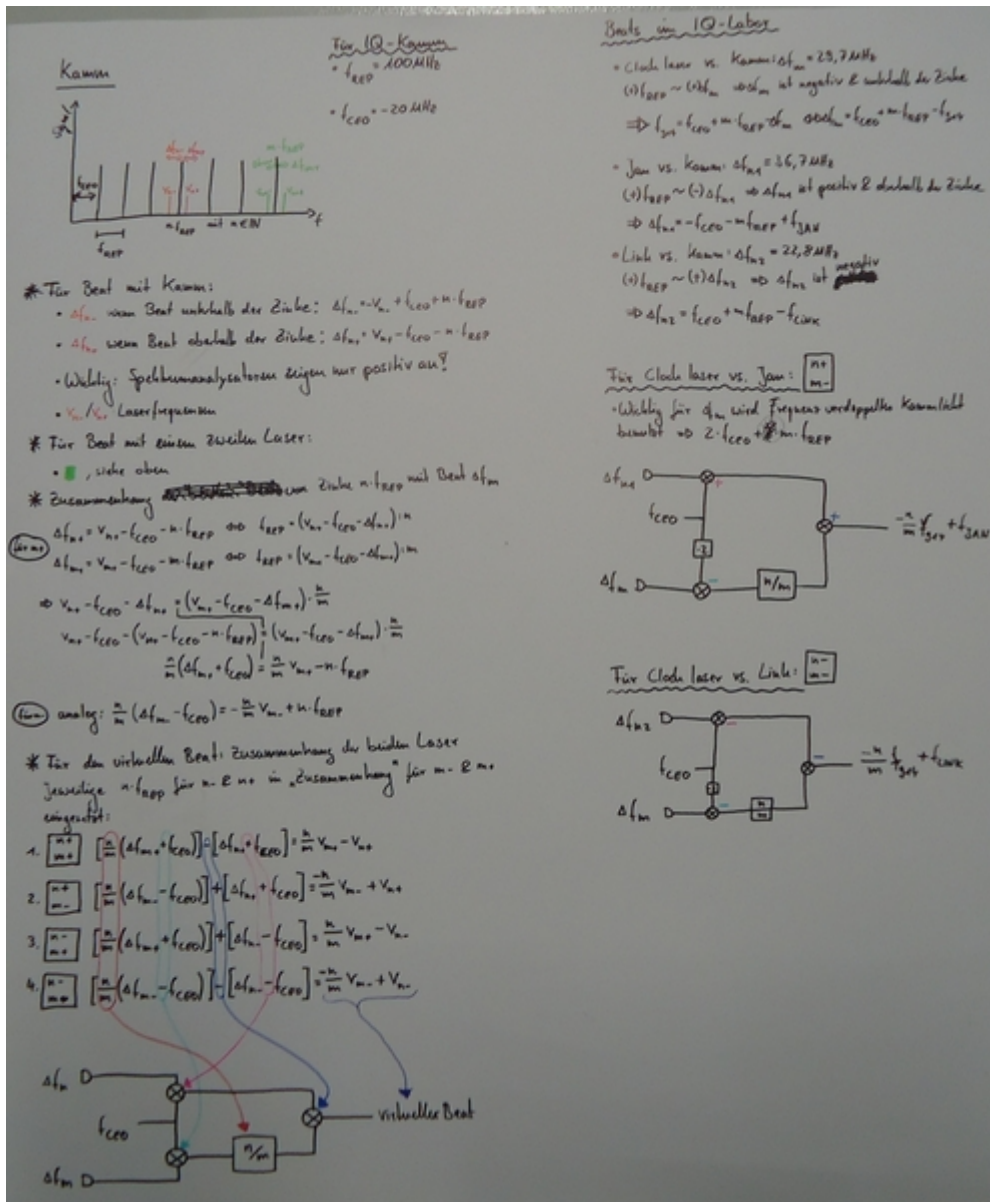
Scheme

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: $N=n_{916}/n_{\text{Link}} = 3275292/1944000 = 1.684820987654321\dots$ Inverted Ration: $N'=1/N$ For
DDRS: $M=(N') \cdot 2^{48} = 167065212727755.34375$ (dez) = 97f1e6a8b1cb.58 (Hex) $\sim = 97f1e6a8b1cb$
Alte Berechnung - → ratio of $\sim 1,684807$ - → 474231011086950,203392 - [Hex]: 1AF4F82F51266 - →
Inverted Ratio: 0,5935397770762964267907798116259 - 0,5935397770762964267907798116259 *
 $2^{48} = 167066594929398,49071775301797611 - 167066594929398$ [Deg] entspricht
97F2390B6AF6 [Hex] → Type 97F2390B6AF6 into the divider!!! *Three corner head measurement*

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