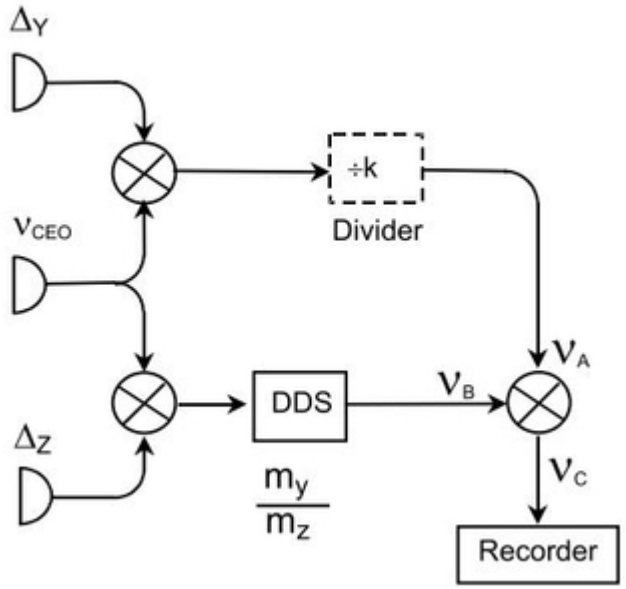
Virtual Beat Measurement

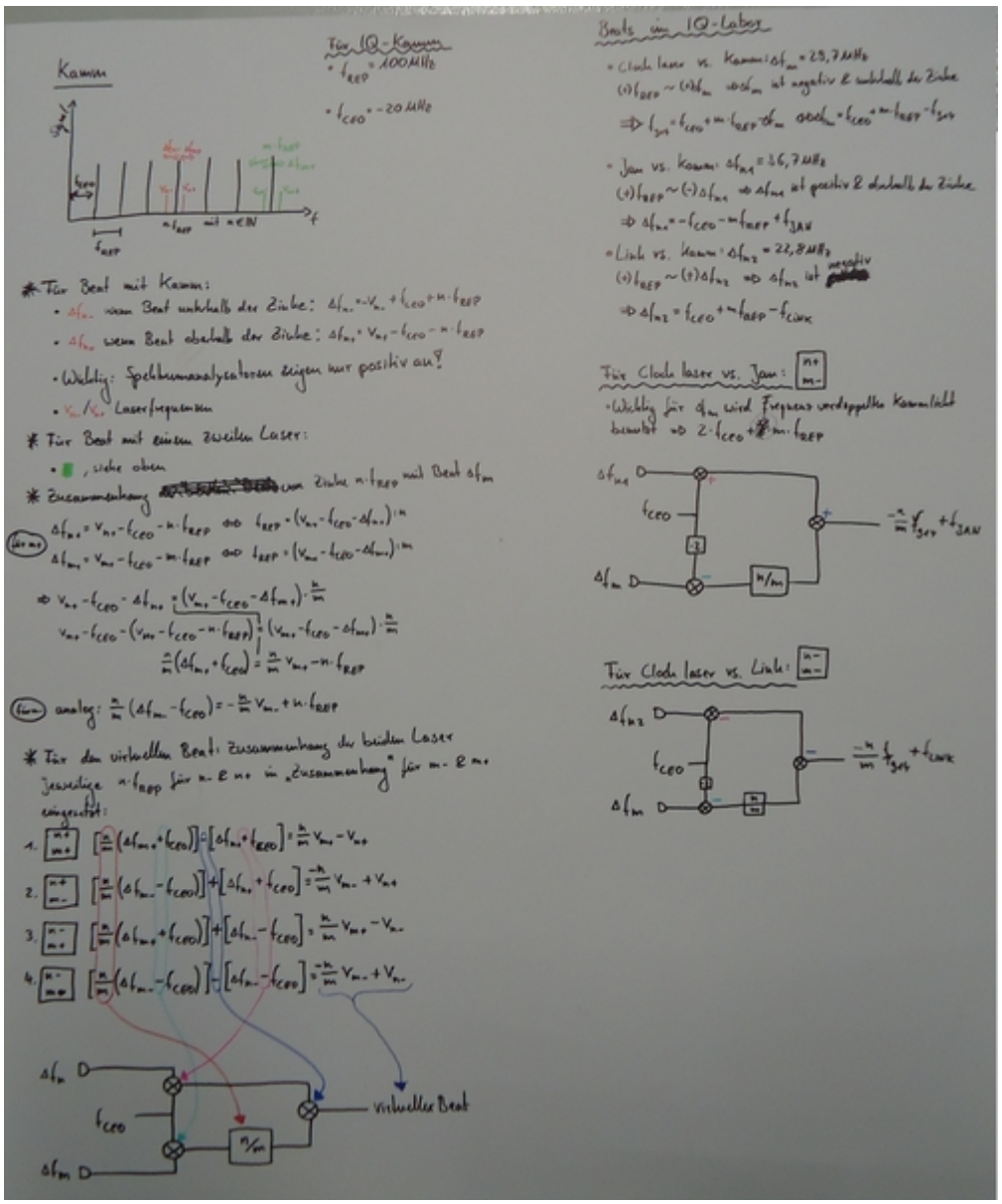
Scheme

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 virtuel beat under: \\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)

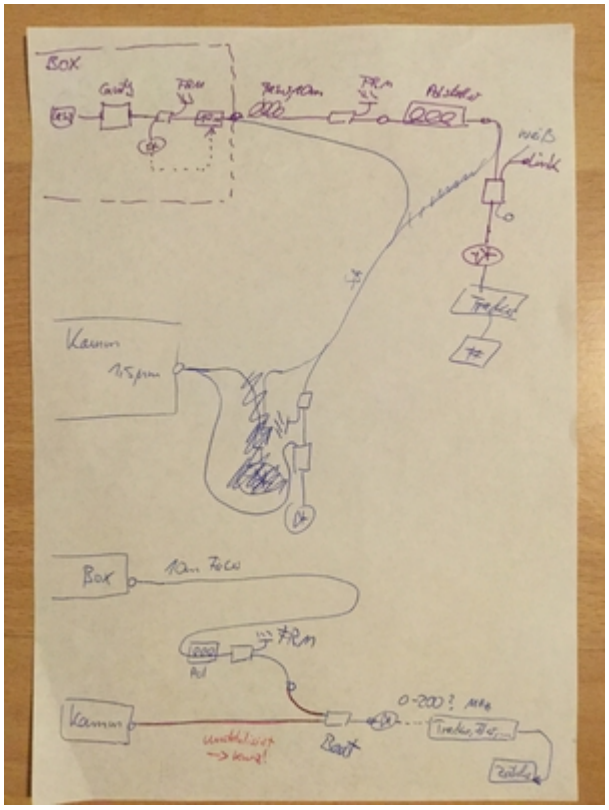
DDS-Programming

1. → ratio of ~ 1,684807
2. → 474231011086950,203392
3. [Hex]: 1AF4F82F51266
4. → Inverted Ratio: 0,59353977707629642679077981162 59
5. 0,59353977707629642679077981162 59 * 2^48 = 167066594929398,49071775301797611
6. 167066594929398 [Deg] entspricht 97F2390B6AF6 [Hex]

→ Type 97F2390B6AF6 into the divider!!!

First measurement ideas

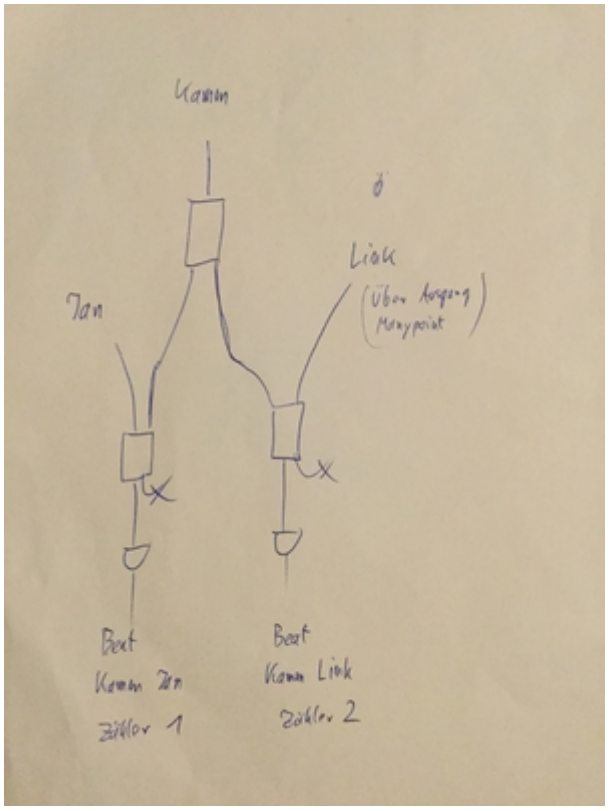
Jan´s laser vs. Comb Hannover



- purple = current setup (06.10.2016)

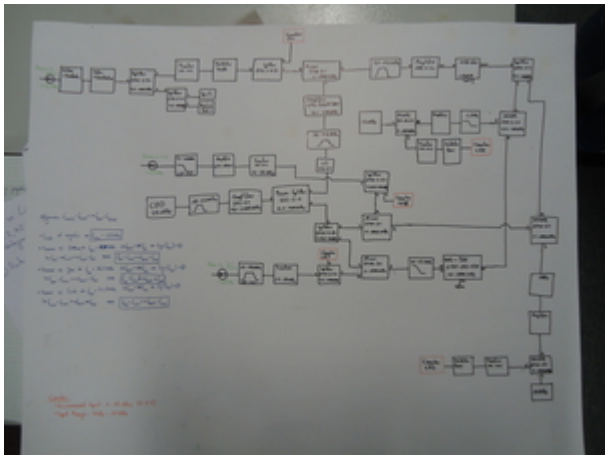
- blue = setup for measurement
- red = unstabilized fiber → keep it short!

Jan´s laser vs. Comb Hannover and Link vs. Comb Hannover



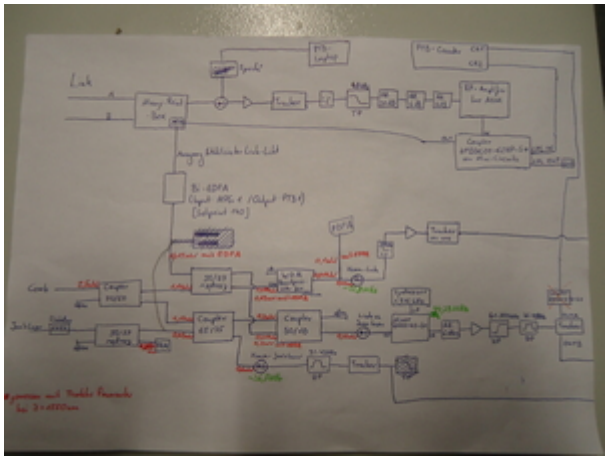
- Shift the ManyPointBox and Link to the optical table

Second Try



Final Setup

Optical part



Electronic part

Three Corner Head Measurement - PDF-version