

Ultra-stable local oscillator (H-Beast)



- [Labbook](#)
- [ToDo](#)
- [List of ideas/open questions](#)
- [Wishlist](#)
- [List of orders and status](#)
- [Paper](#)
- [List of collaboration partner and companys](#)

Setup

Resonator

- [Mirrors/Contamination](#)
 - [Substrates](#)
- **Finesse measurement**
 - **Finesse measurement outside vacuum**
 - [Finesse measurement without spacer](#)
 - [Finesse measurement with spacer](#)
 - [Birefringence measurement with spacer](#)
 - **Finesse measurement inside vacuum**
- [ULE-compensations-rings](#)
- [Spacer](#)
- [Optical Mask](#)
- [Optical Contacting](#)
- **Calculations**
 - [Calculation of Finesse outside vacuum](#)
 - [Calculation of reflectiondip / Impedance of the cavity](#)
 - [Calculation between cavity spectrum and frequency distance](#)
 - [Calculation of EOM frequency](#)

- [Calculation of linewidth](#)

Mounting

- [Mounting](#)
- [Cleaning of the mounting](#)

Vacuum

- **Vacuum tests**
 - [Vaccum tests](#)
- **Bake out**
 - [Bake out tips](#)
 - [Bake out List](#)
 - [Bake out protocol](#)
- **Vacuum Components**
 - [Vacuum chamber](#)
 - [CF-components: Pump, Sensor, Valves, etc.](#)
 - [Attaching of the vacuum feedthroughs](#)
 - [Seal material and vacuum suitable glue](#)
 - [Anpressring für die Fenster](#)
- **Heat shield's**
 - [Components: Heat shield and vacuum suitable screws](#)
 - [Electrolytic polishing](#)
 - [Mass spectrometry](#)
 - [Determination of transport screws for the resonator](#)
 - [Attaching of the windows on the heat shields](#)
- **Vacuum optics**
 - [Optical components inside the vacuum: Windows and isolator](#)
 - [Attaching of the windows on the vacuum chamber](#)

Optics

- **Incoupling breadboard**
 - [Incoupling breadboard](#)
 - [Components](#)
 - [Mode Matching](#)
- **Outcoupling breadboard**
 - [Outcoupling breadboard](#)

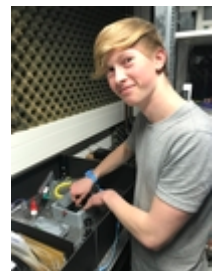
Electronics

- **Electronics inside the vacuum**
 - [Components for the electronics inside the vacuum and accessories](#)
 - [Instructions for attaching the electronic and labelling of the NTC's](#)
 - [Characterization of the NTC's](#)
- **Electronics outside the vacuum**
 - [PTB electronic assignment](#)
 - [Components for the electronics outside the vacuum](#)
 - [Labelling of the cables](#)

Laser at PTB

- Company: NKT Photonics
- Fiber laser Koheras Basik Module
- Product type: K122-102-665
 - Wavelength: 1542.14 nm
 - Power setpoint: 40 mW
 - Power Range: 12-40 mW
 - Wavelength tuning: -499.9 ... +570 pm
 - Power stability 0.01 dB

Laser at IQ



- [Todo List](#)
- Wavelength: 1560.47 nm
- ITU channel number 21, 192.10 THz, 1560.61 nm
- [Laserdiode](#)
- [Laserdiode Mount](#)
- [Laser driver](#)
- [Pin assignment/Cables](#)
- [Temperature Controller](#)
- [Laser Housing](#)

Fiber setup

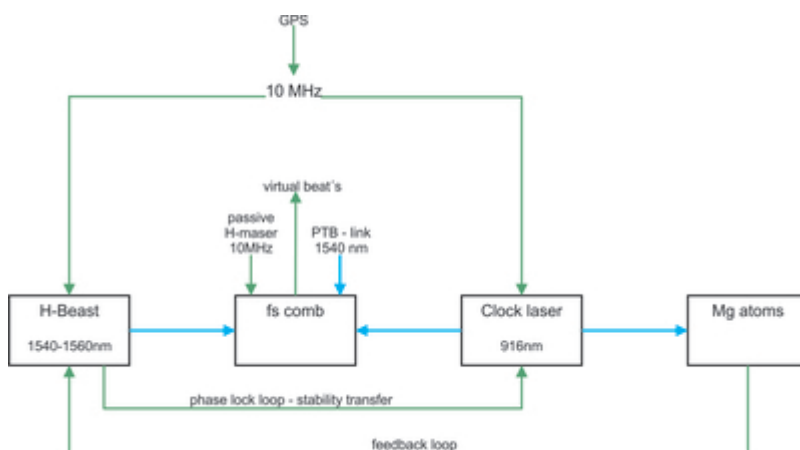
- Fiber-components
 - Fiber-Photodiode (IQ Version)
 - EOM and AOM Box
- Electronic-Components
- Fiber-connections
- **Vibration isolation**

Performance / Measurements

- Thermal noise limit
- Pound-Drever-Hall (PDH)
- Residuelle Amplitudenmodulation (RAM)
- Vacuum pressure

Future Setup @ IQ

- **Transfer of stability:**
 - Providing 10–16 Short-Term Stability of a 1.5- μm Laser to Optical Clocks
, C. Hagemann et. al., IEEE Transactions on instrumentation and measurement, VOL. 62, NO. 6 (2013)



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