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Generation of squeezed light @1550nm

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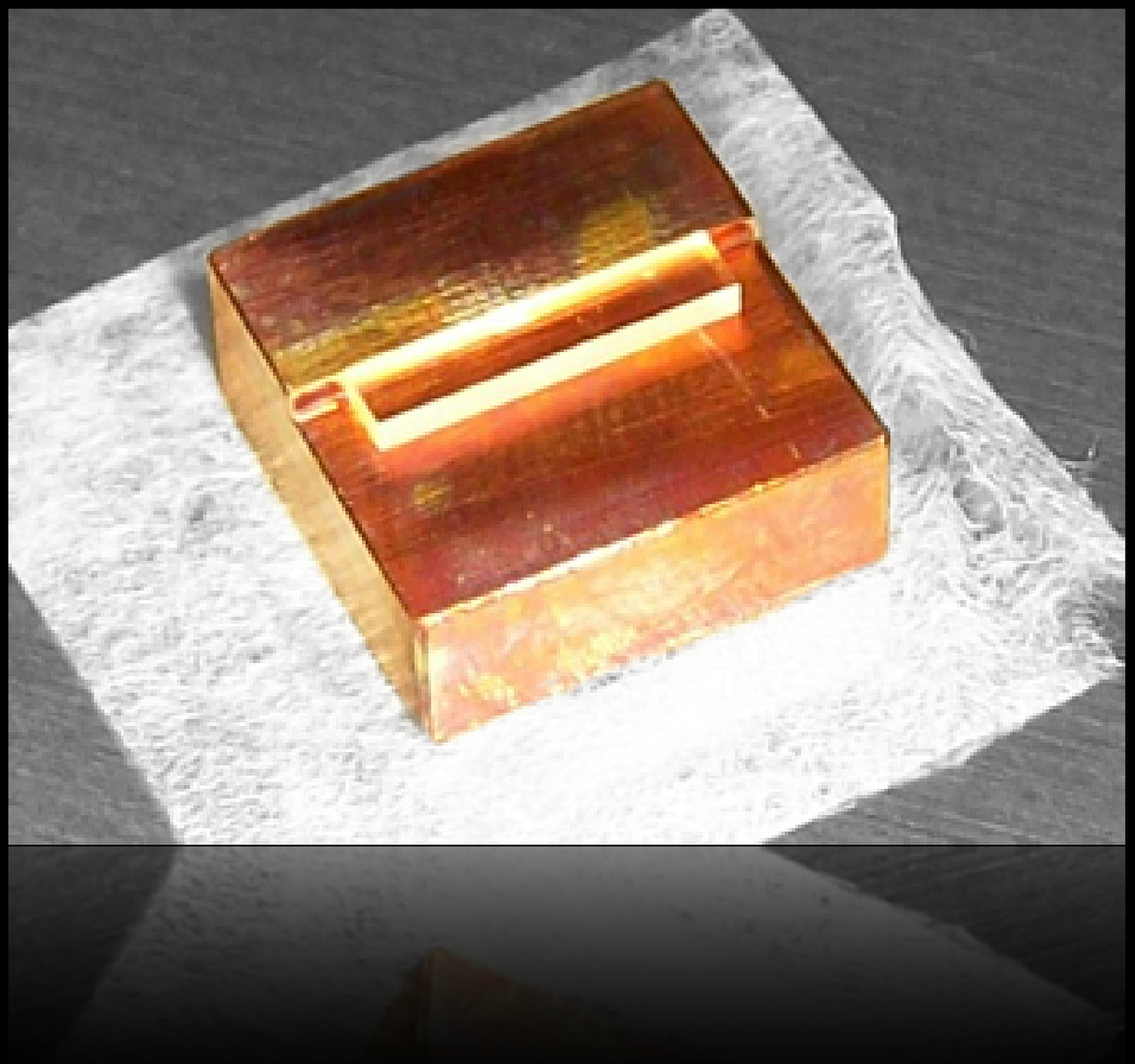
LIGO-G080549-00-Z

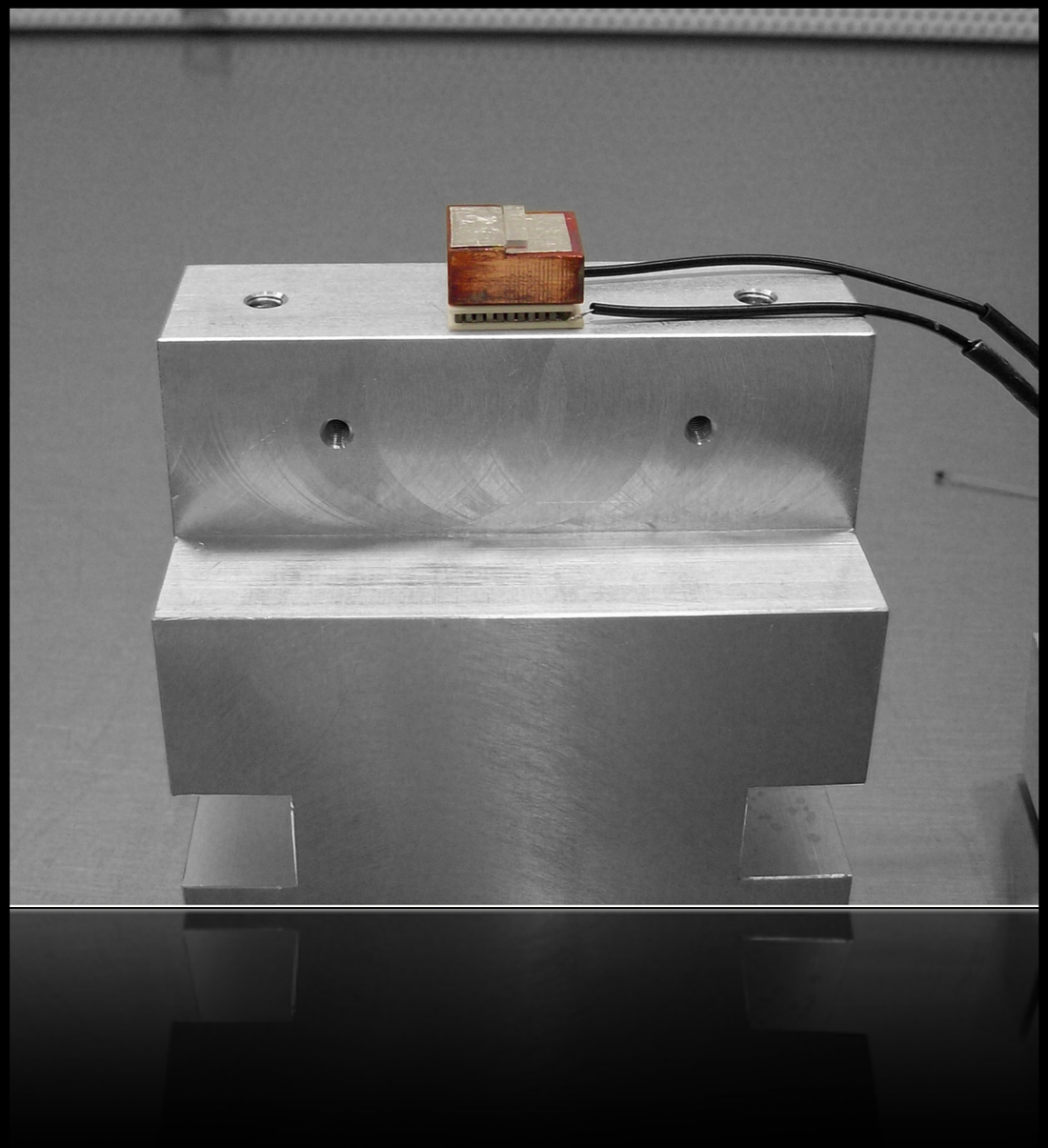
Experimental setup



The PPKTP crystal

- Quasi-phase matching between 20-50°C
  (bulk lithium niobate: >180°C)
- Phase matching condition less critical
- dimensions: 10 x 2 x 1 mm^3
- double AR coated @1550/775nm

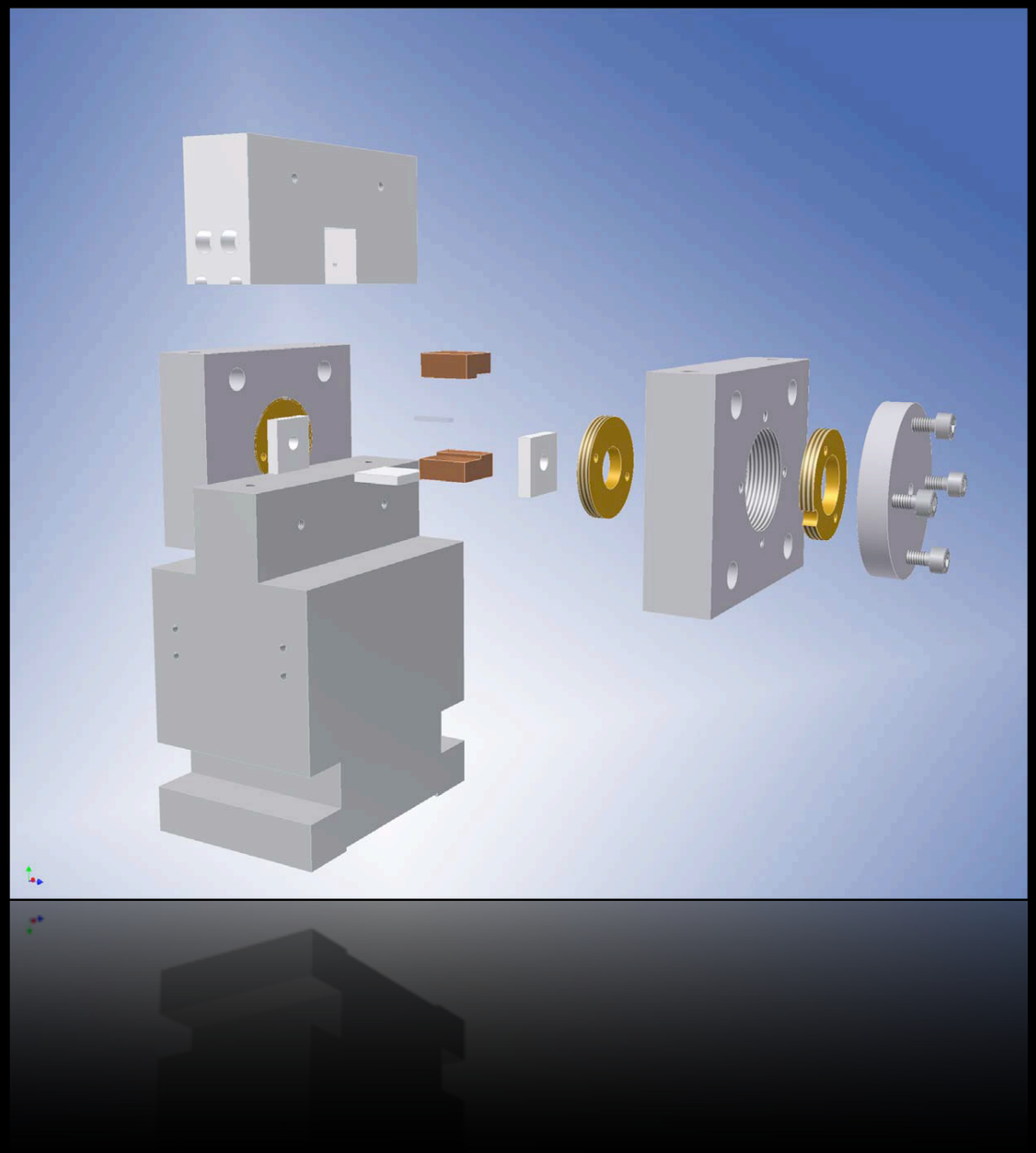
Experimental setup



New oven construction

- one Peltier element to tune crystal temperature
- aluminum body

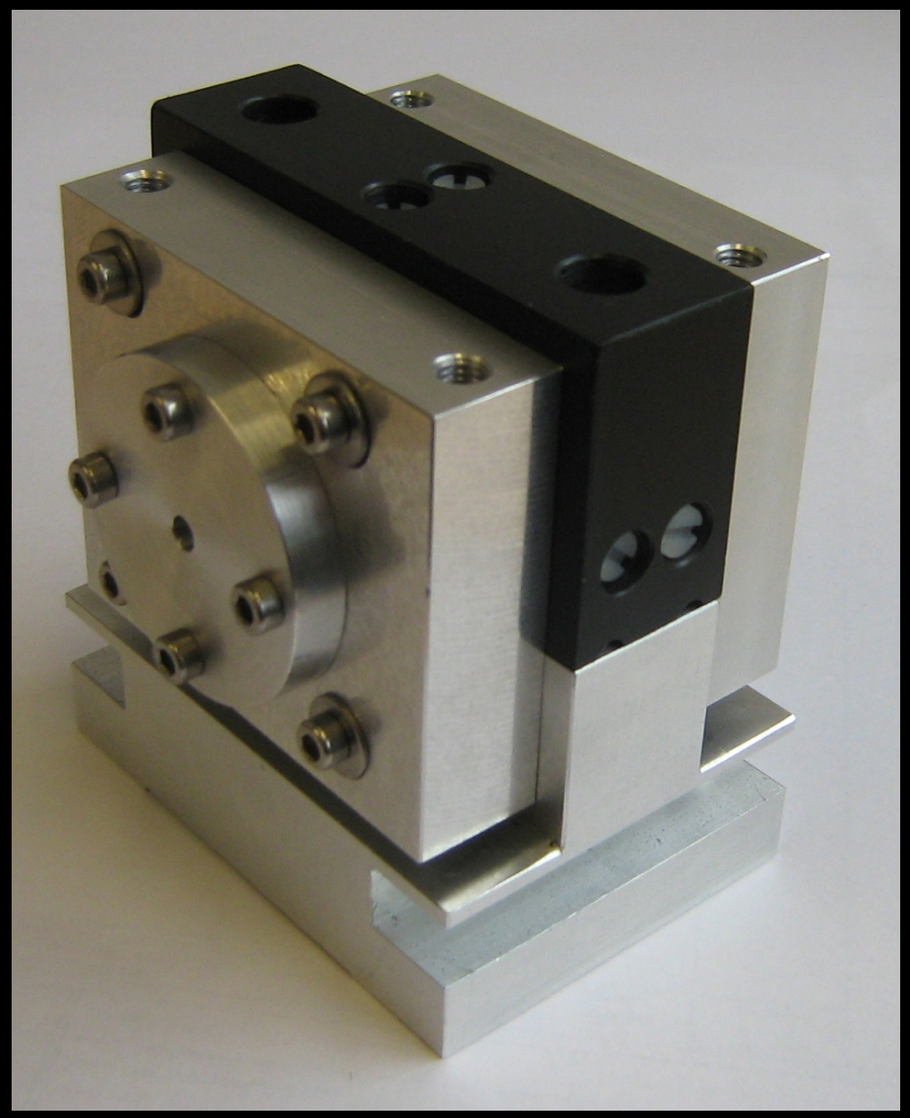
Experimental setup



New oven construction

- one Peltier element to tune crystal temperature
- aluminum body
- plastic (POM) housing for thermal and electrical insulation
- external mirrors rigidly mounted inside aluminum blocks

Experimental setup



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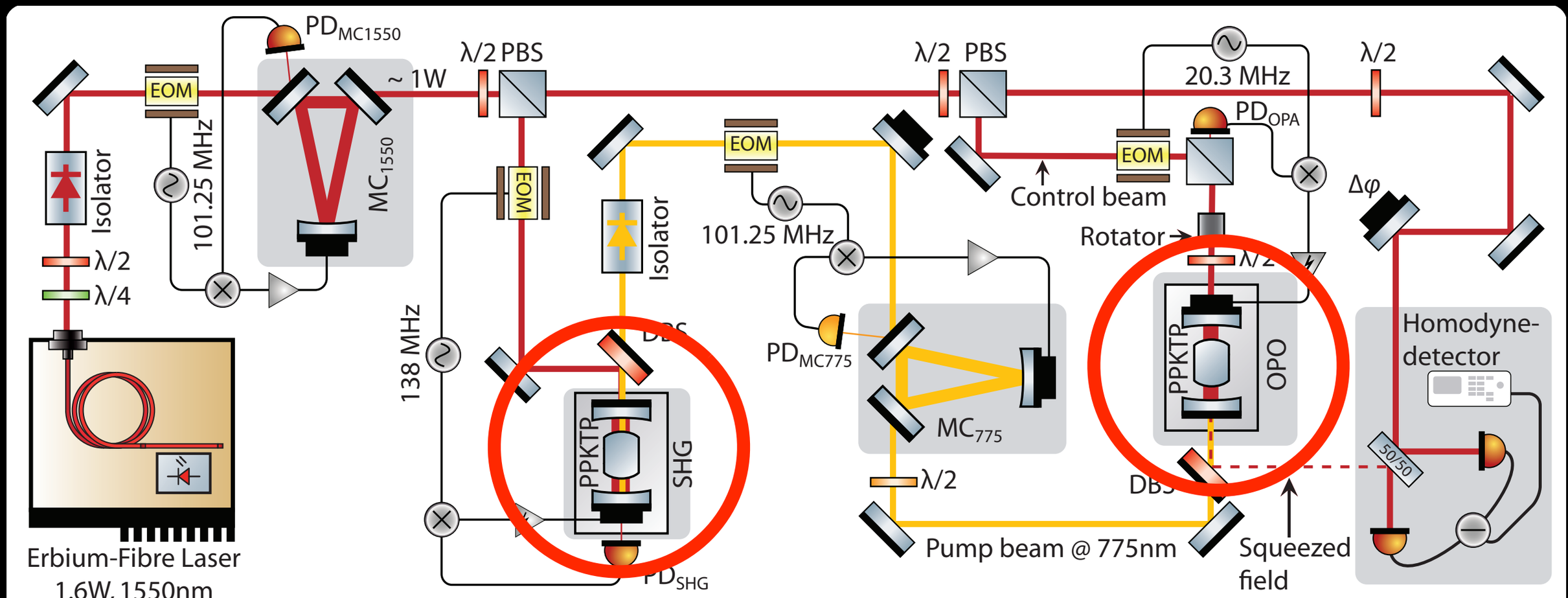
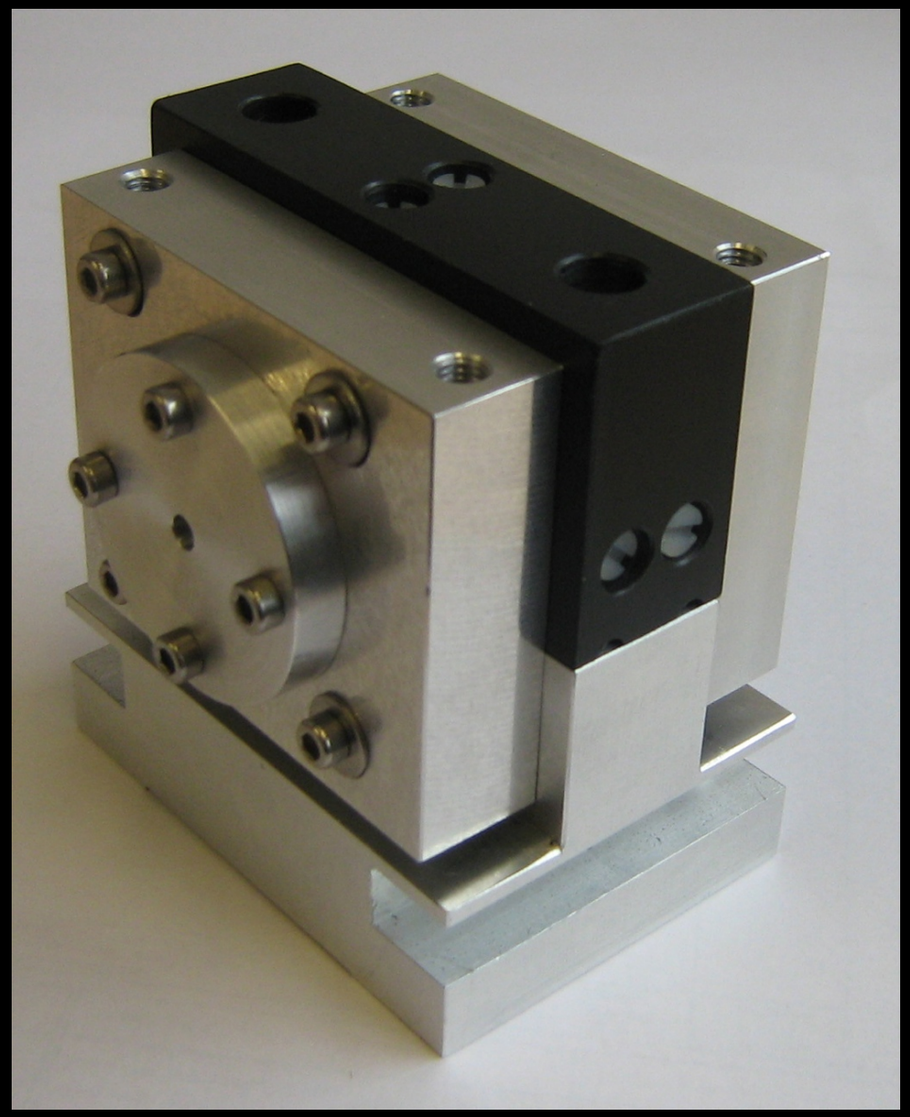


2 non linear cavities

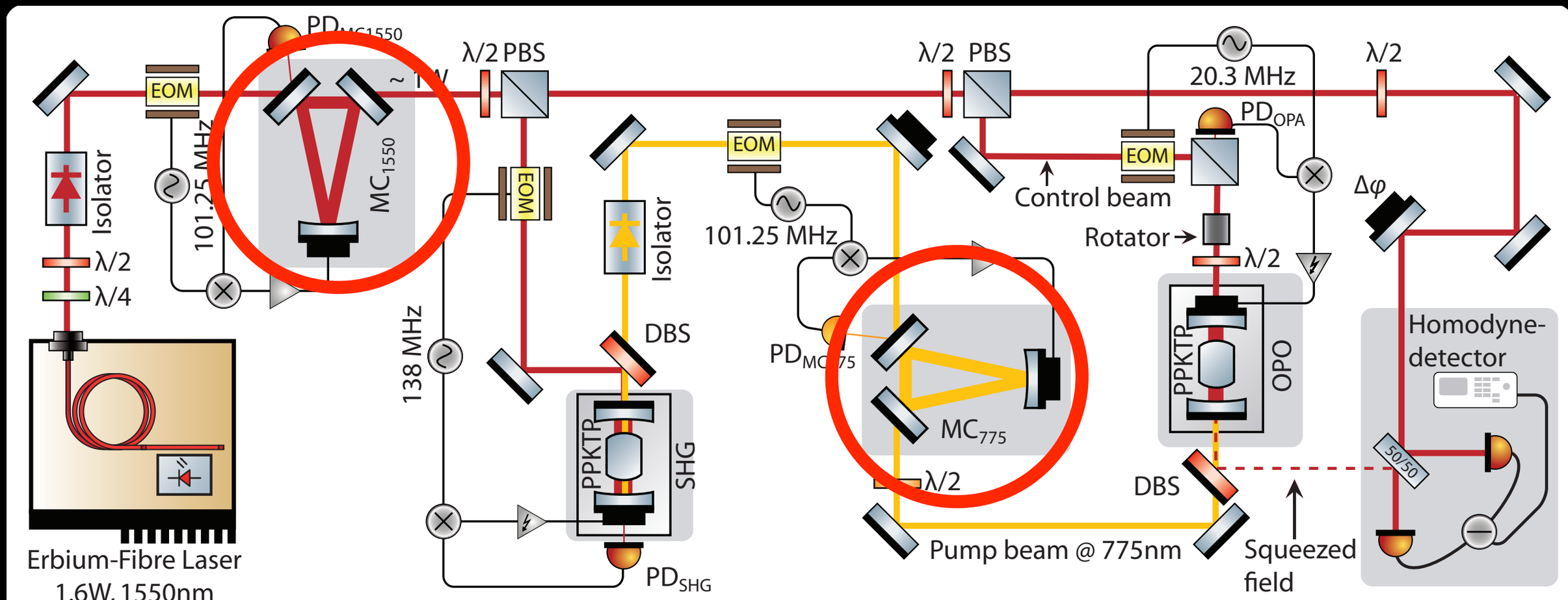
Experimental setup



SHG / OPA resonator

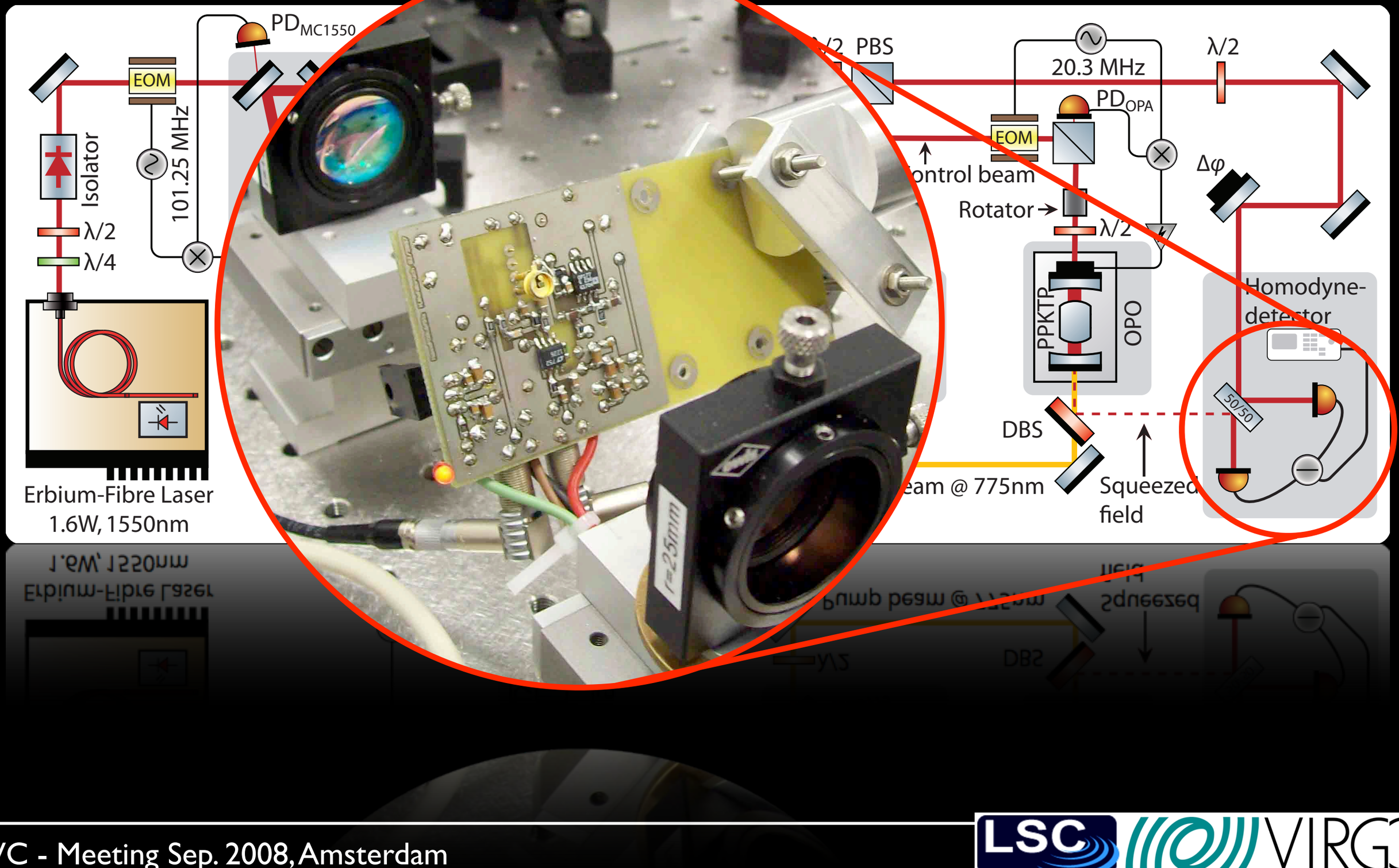
- Backside mirror HR@1550/755nm
  R > 99.96%
- In/Out coupling mirror:
  - SHG: R = 92%
  - OPA: R = 90%
- Cavities.
  - SHG: F≈75, FWHM≈43MHz
  - OPA: F≈60, FWHM≈34MHz

Experimental setup

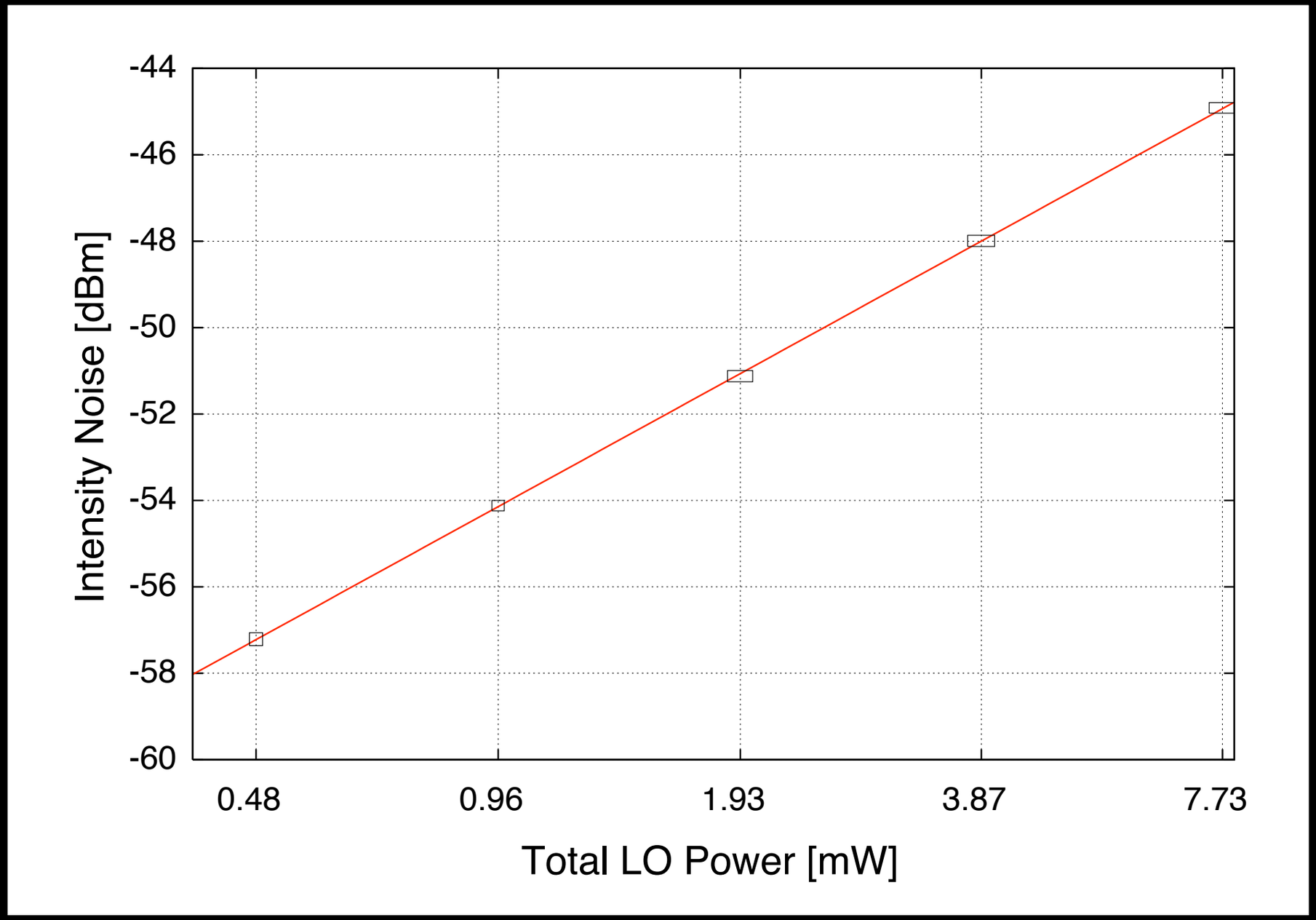


2 filter cavities

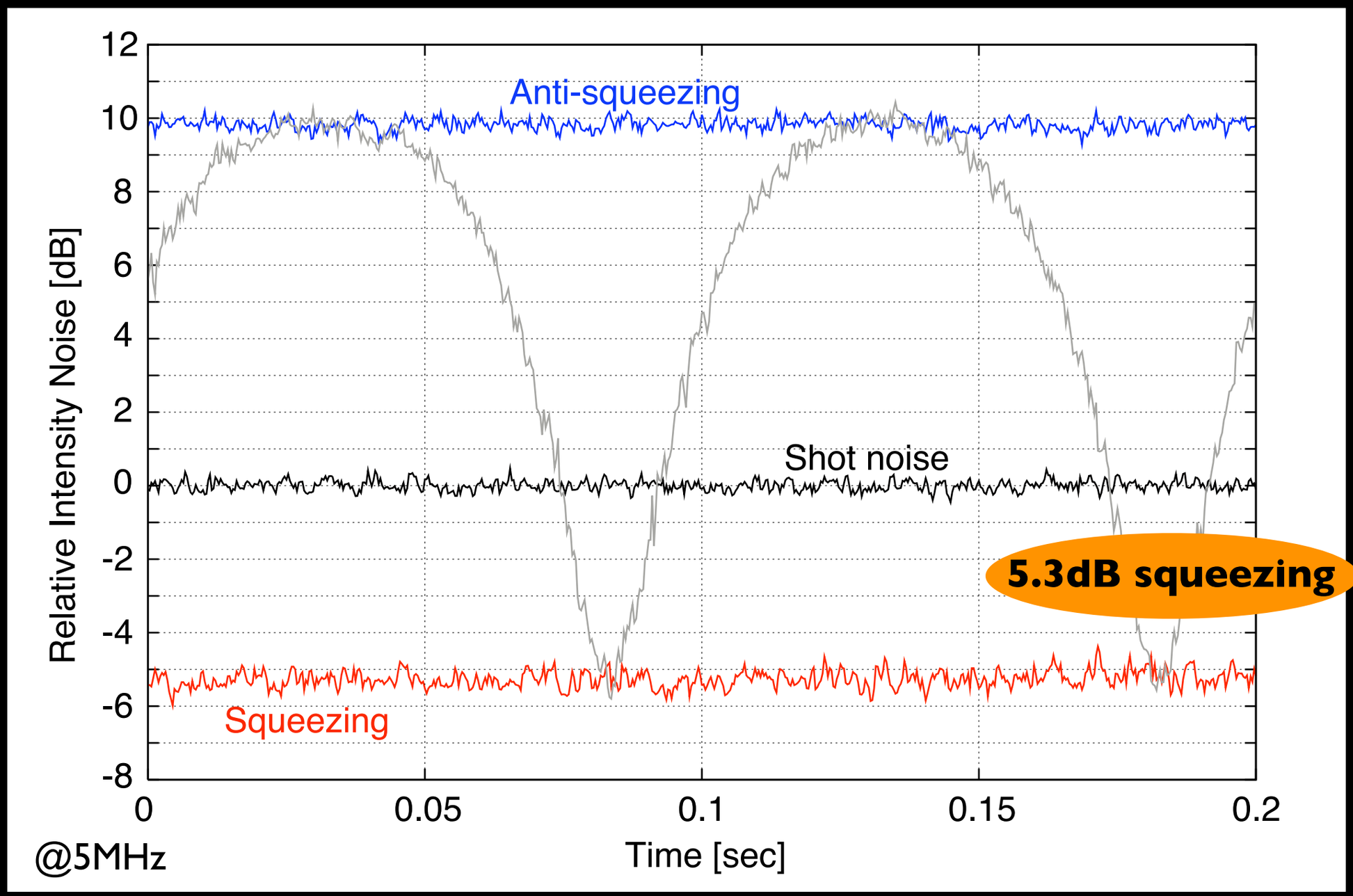
Experimental setup



Test of detector linearity

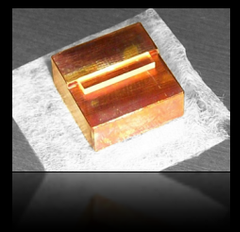


First results



Summary and Conclusion

- Implementation of an off-the-shelf fibre laser in a squeezing experiment
- Use of PPKTP in OPA/SHG



- Generation of -5.3dB squeezing @1550nm
- Future work:
  - stabilize the fibre laser
  - generation of high level audio band squeezing