

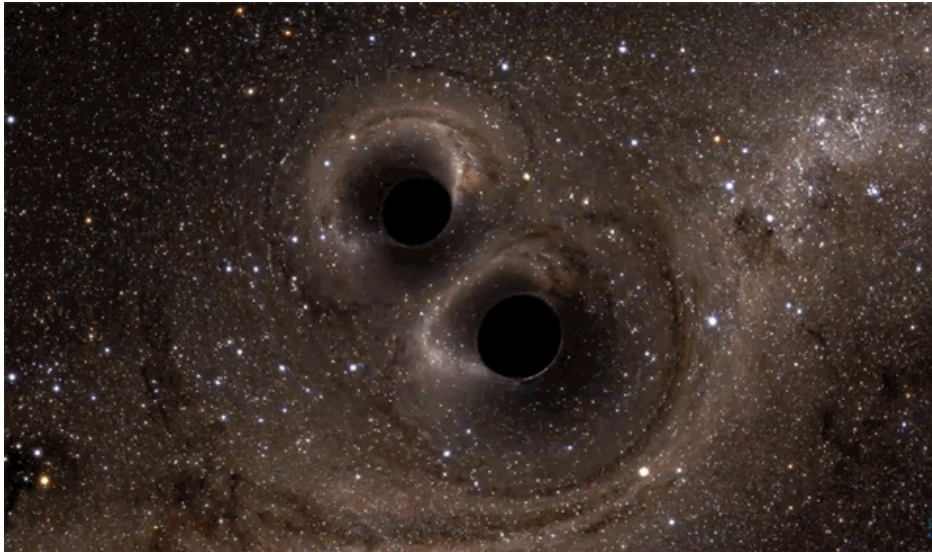


Data analysis of an electro-optical simulator and contribution to LISA system studies

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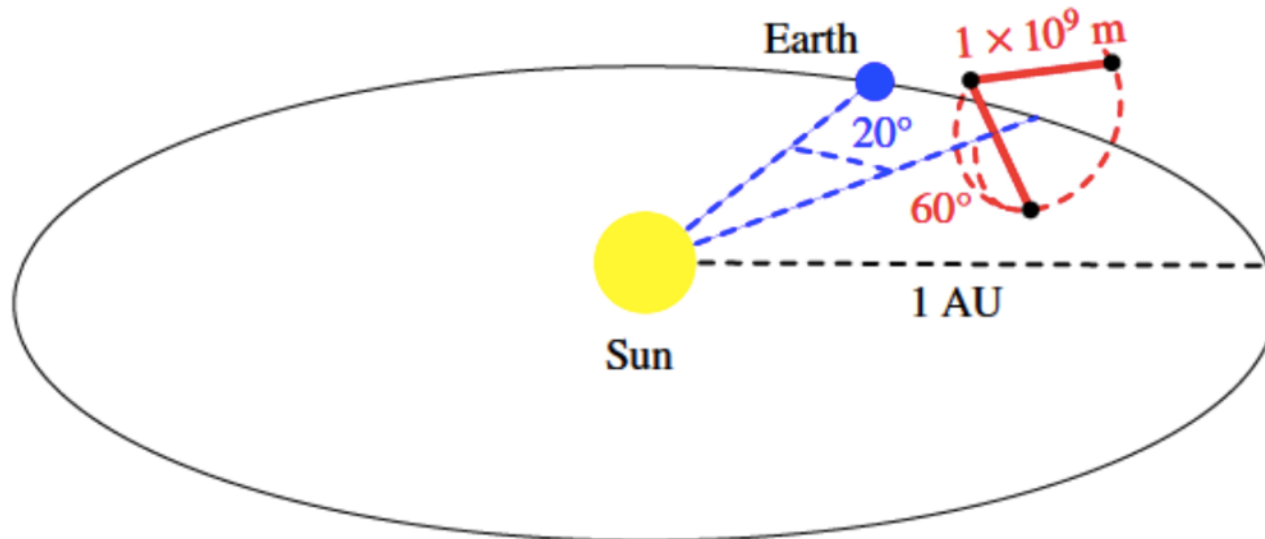
Gravitational waves

- Propagating deformations of space-time
- Produced by accelerated, aspherical massive systems
- Detected on Earth since 2015
- New window on the Universe



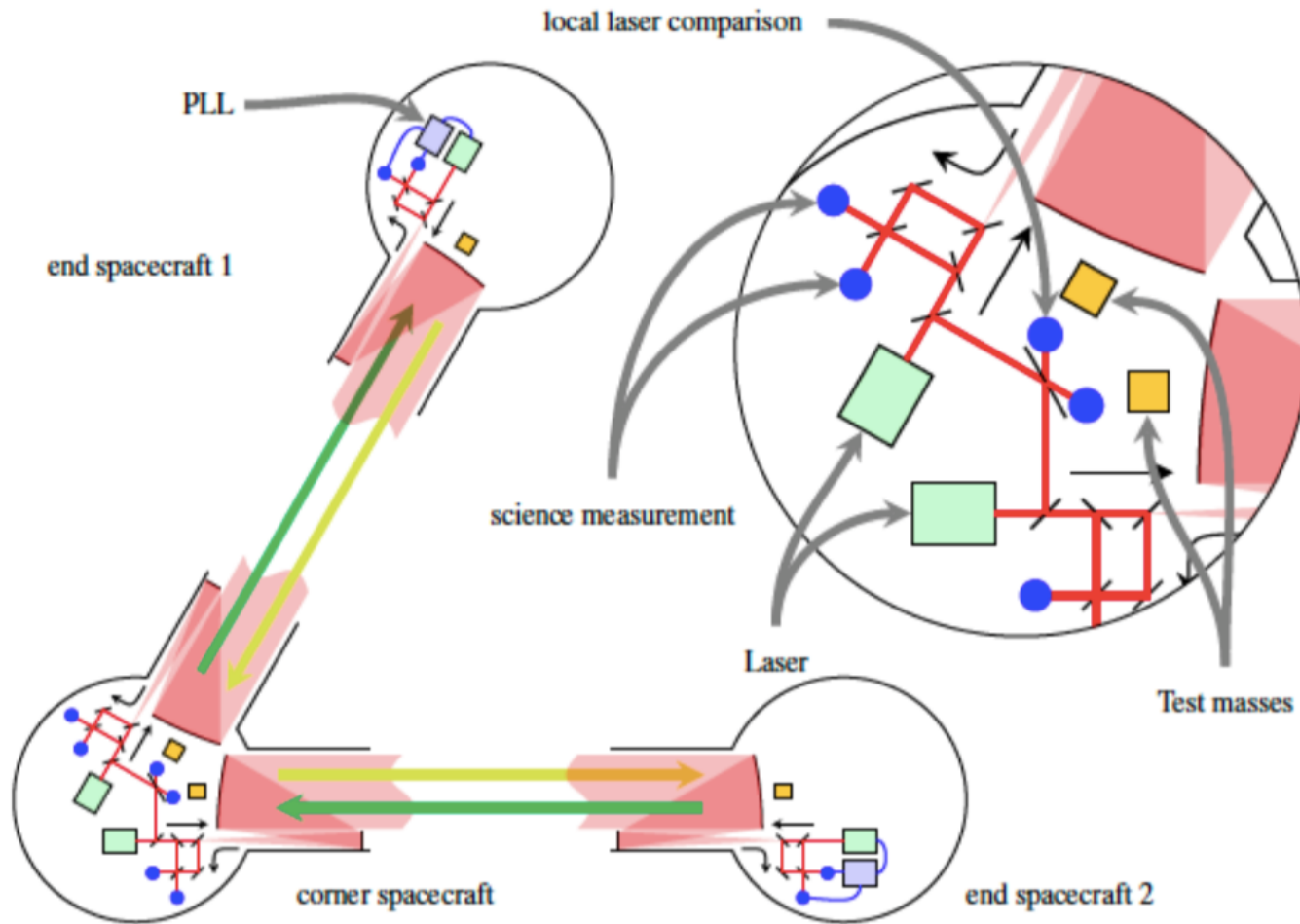
LISA

- Mentioned in the 90s, launch in 2034, ESA-(NASA) mission.
- Three satellites separated by few 10^6 km, forming an equilateral triangle.
- Orbital configuration:



LISA

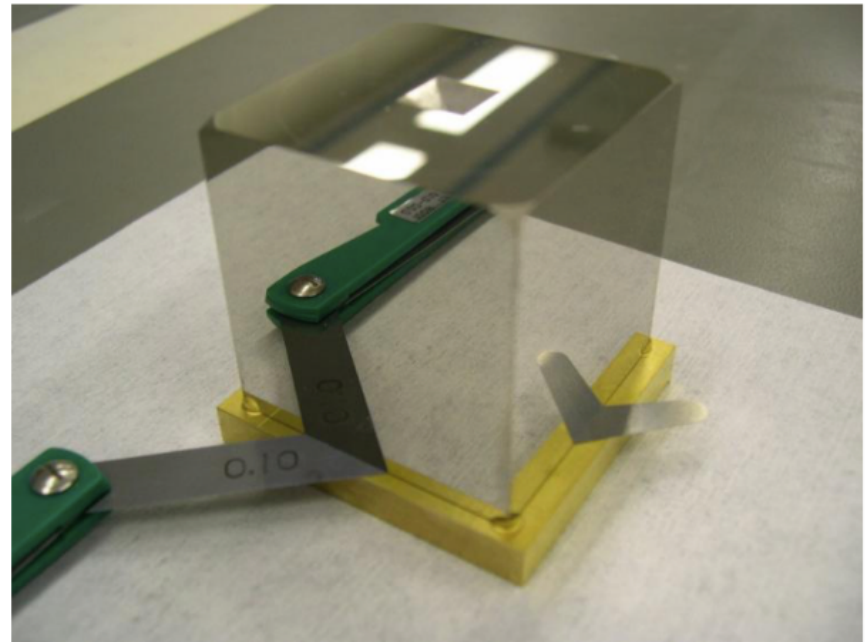
Simplified scheme of the constellation:



LISA

Test masses:

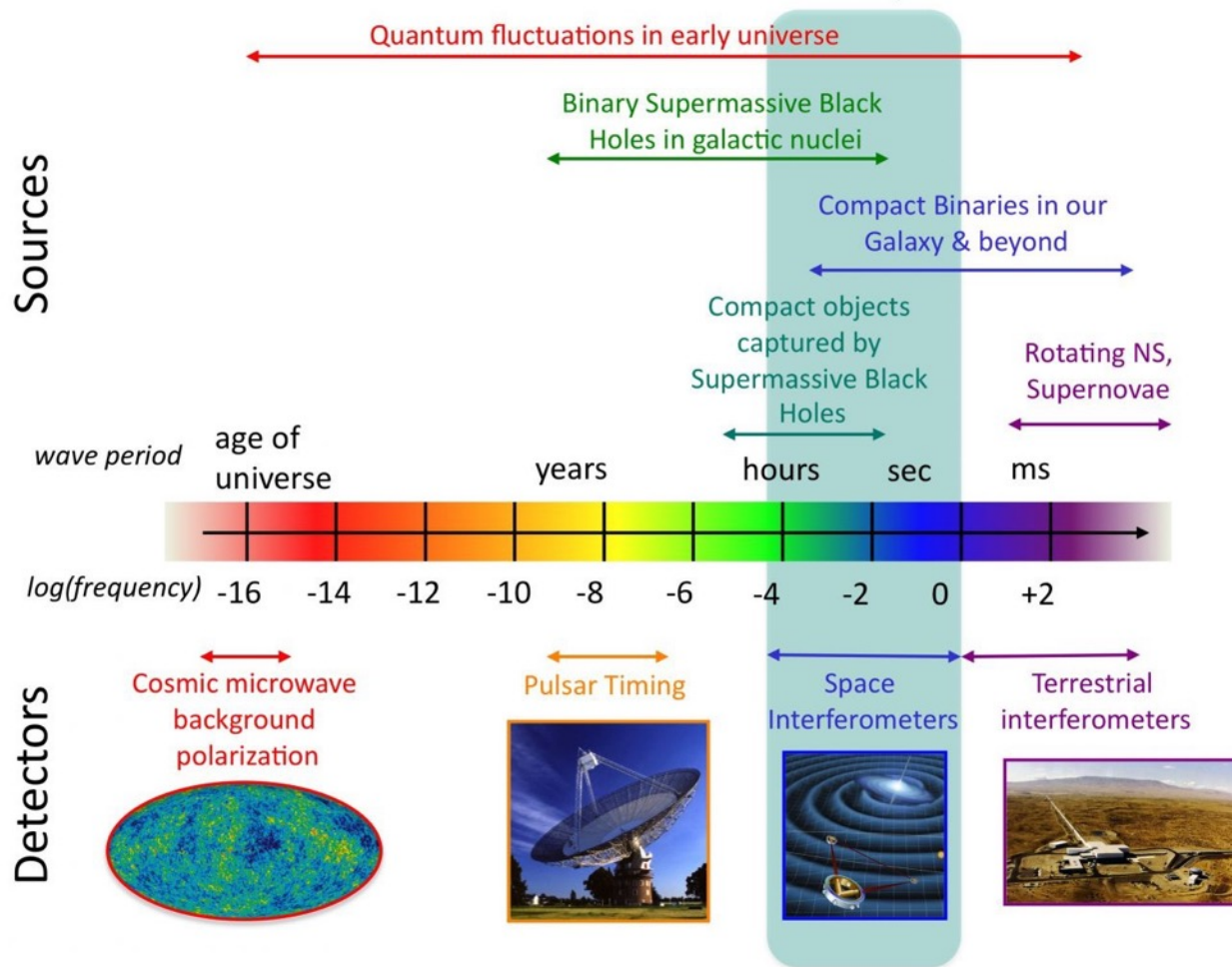
- Only affected by gravitation (free-fall)
- Used as a position reference by the satellites
- Lisa-Pathfinder has demonstrated the technology



One of the test masses of LISA Pathfinder

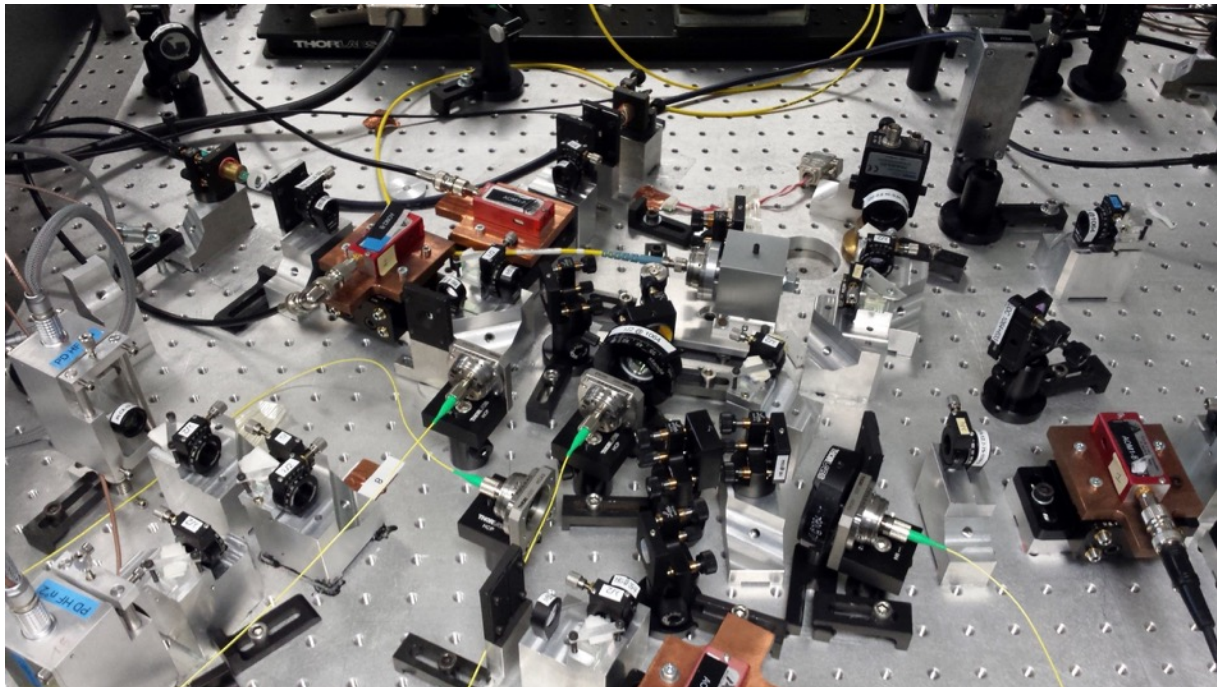
LISA

The Gravitational Wave Spectrum

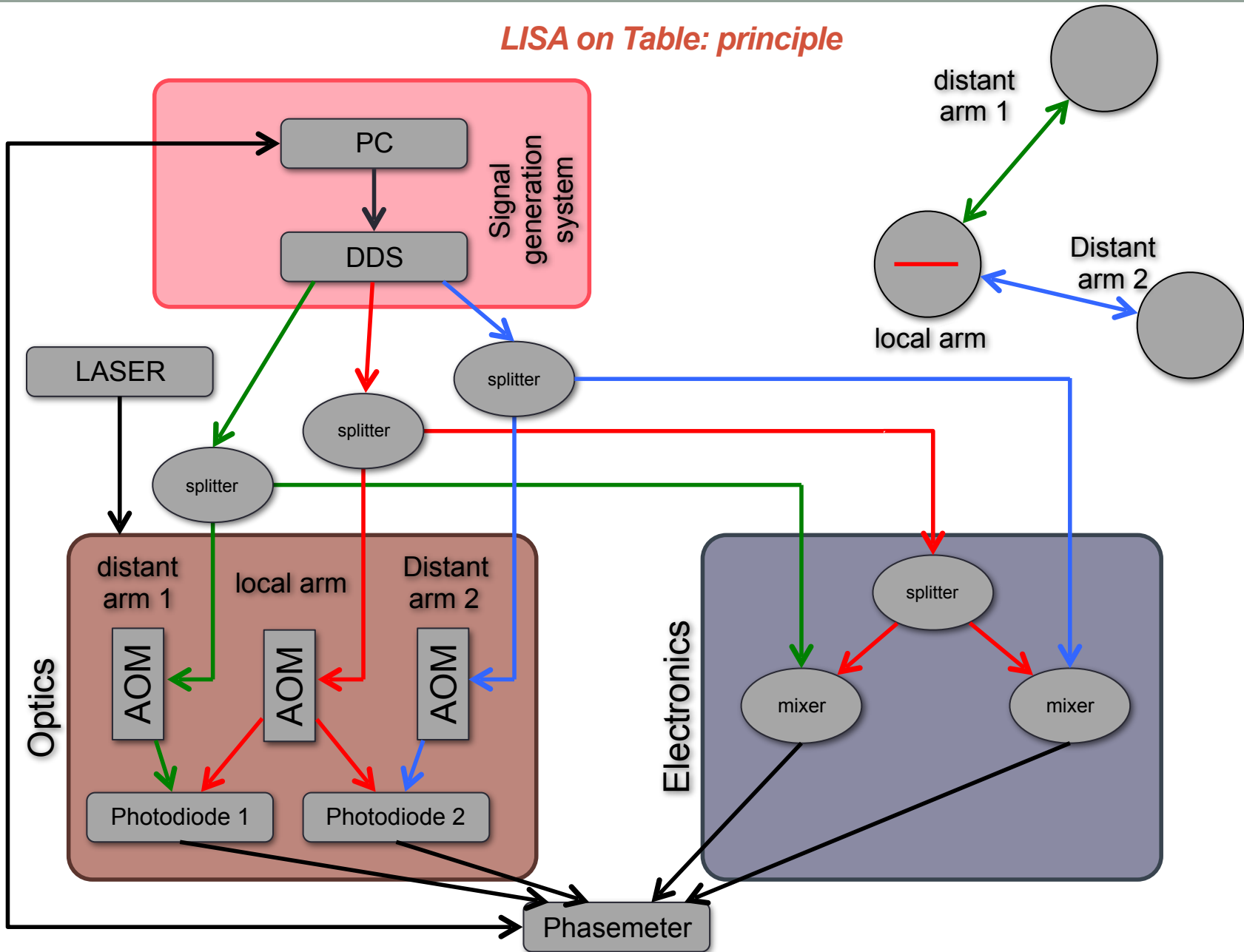


LISA on Table

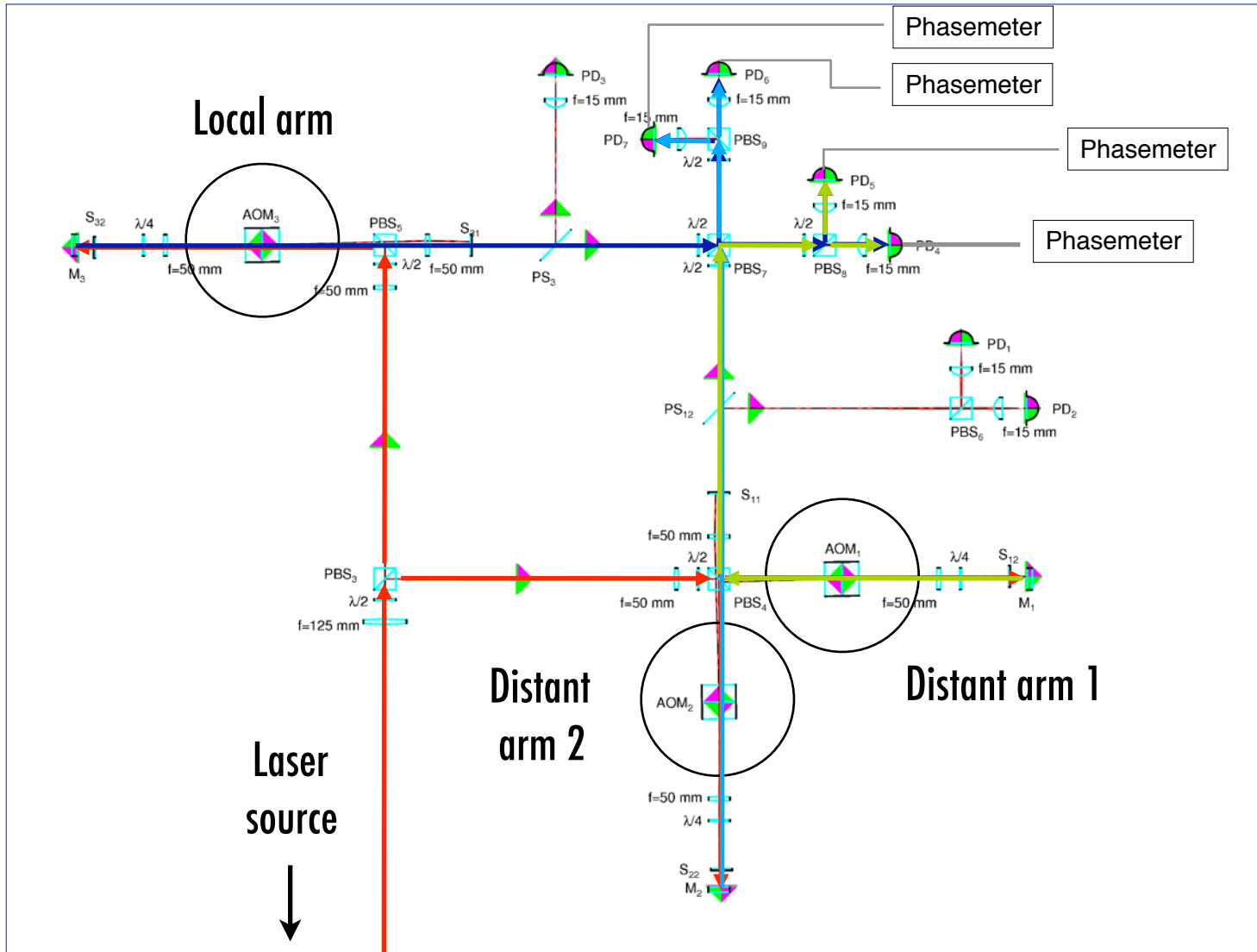
- Optical and electronic simulator of LISA.
- Objectives: to test the noise reduction techniques experimentally, to test instruments (photodiodes, phasemeter, ...) in a representative acquisition chain.



LISA on Table: principle



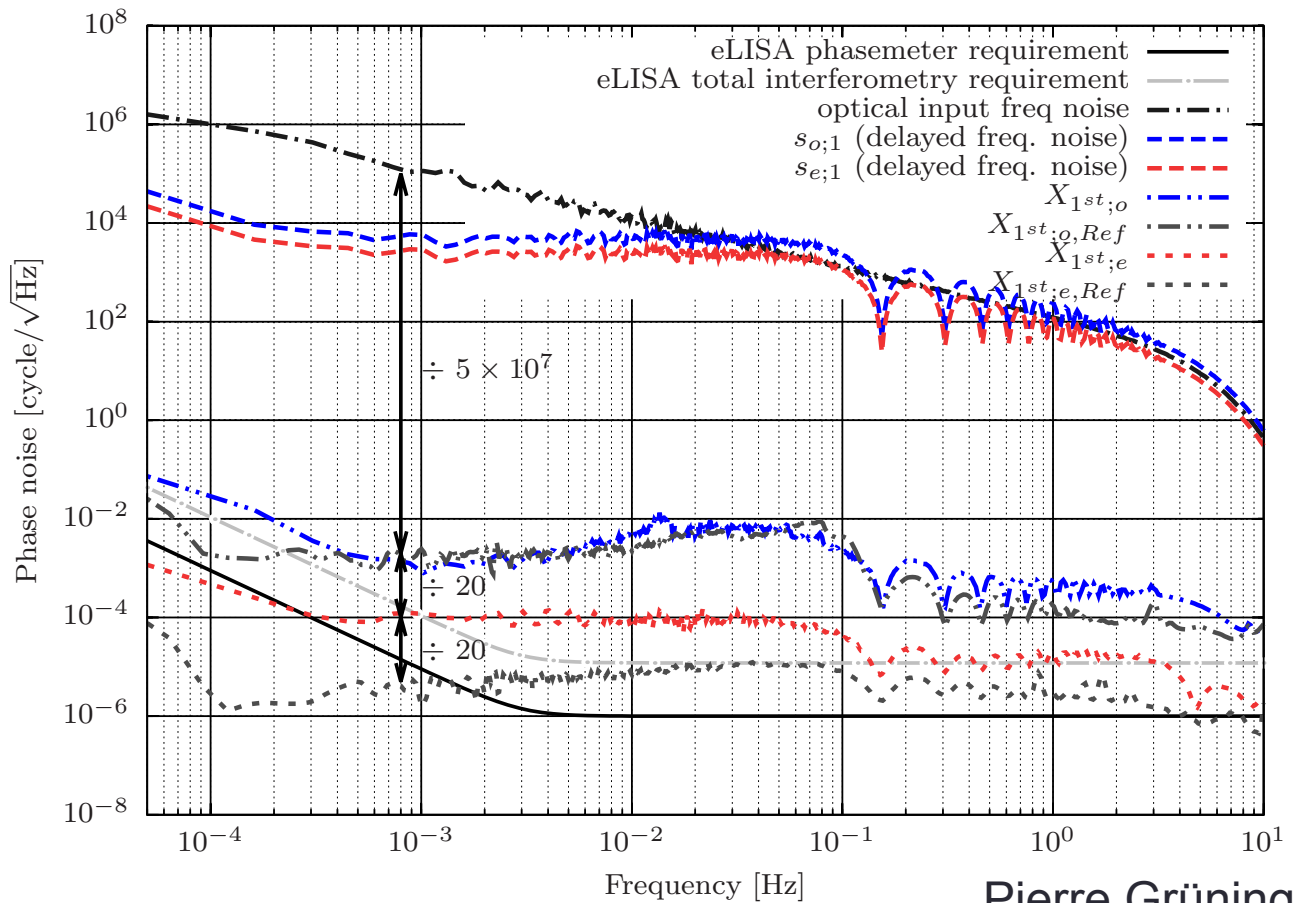
LISA on Table: optical layout



LISA on Table: previous results

Latest results for both interferometers in the following configuration:

- TDI 1st generation,
- static, uneven arms,
- white noise.

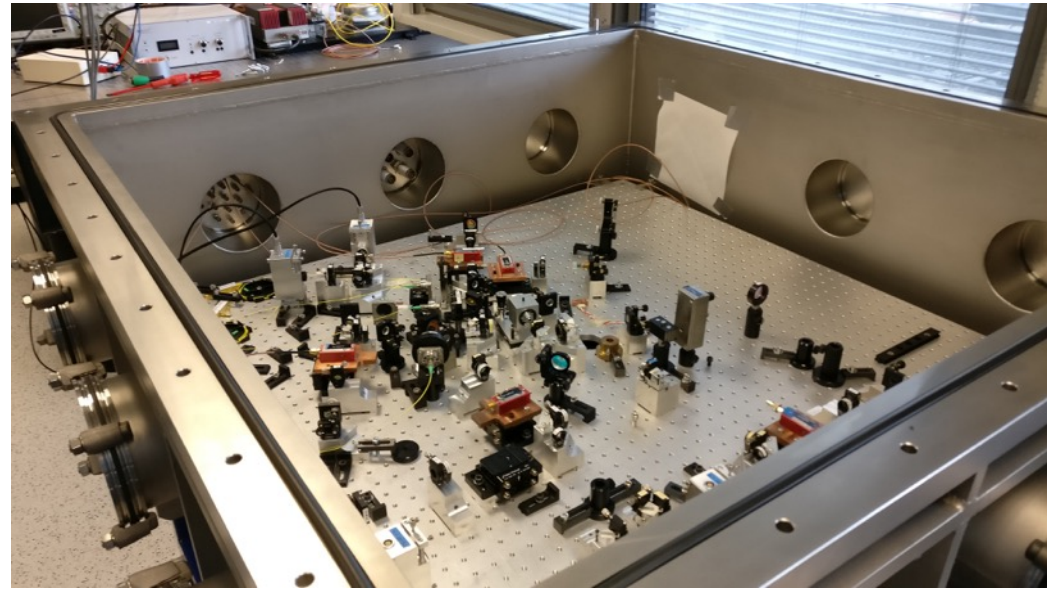


LISA on Table: vacuum chamber

Optical interferometer:

Only limited by the system,
which means TDI works in
this case.

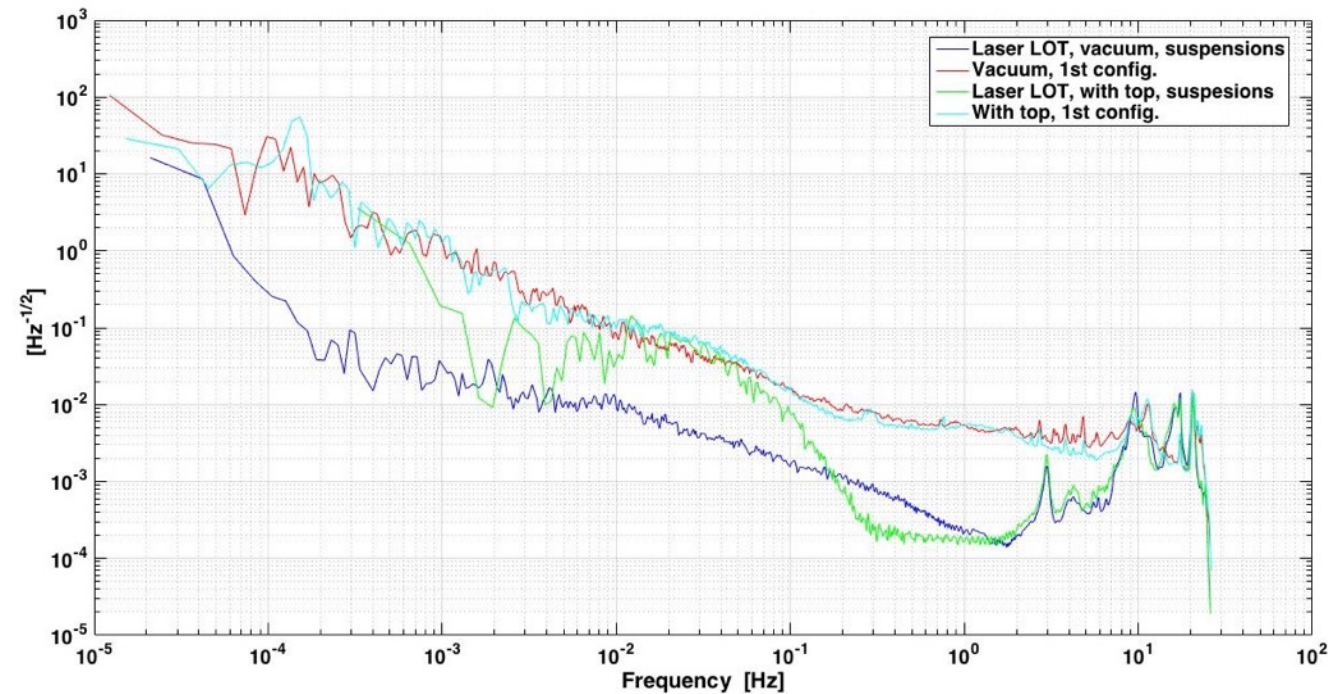
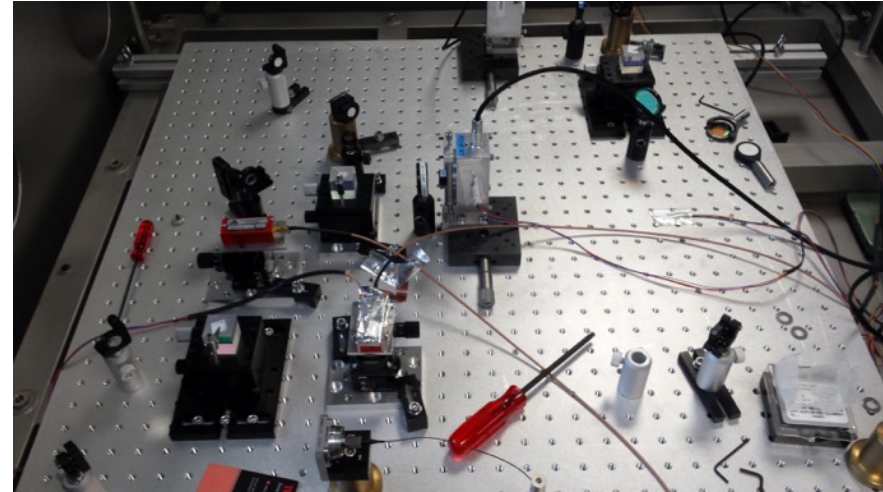
**One must lower the optical
noises of the system.**



What has been done

Preparing the vacuum operation:

- Tests with a small Mach-Zehnder interferometer



What has been done

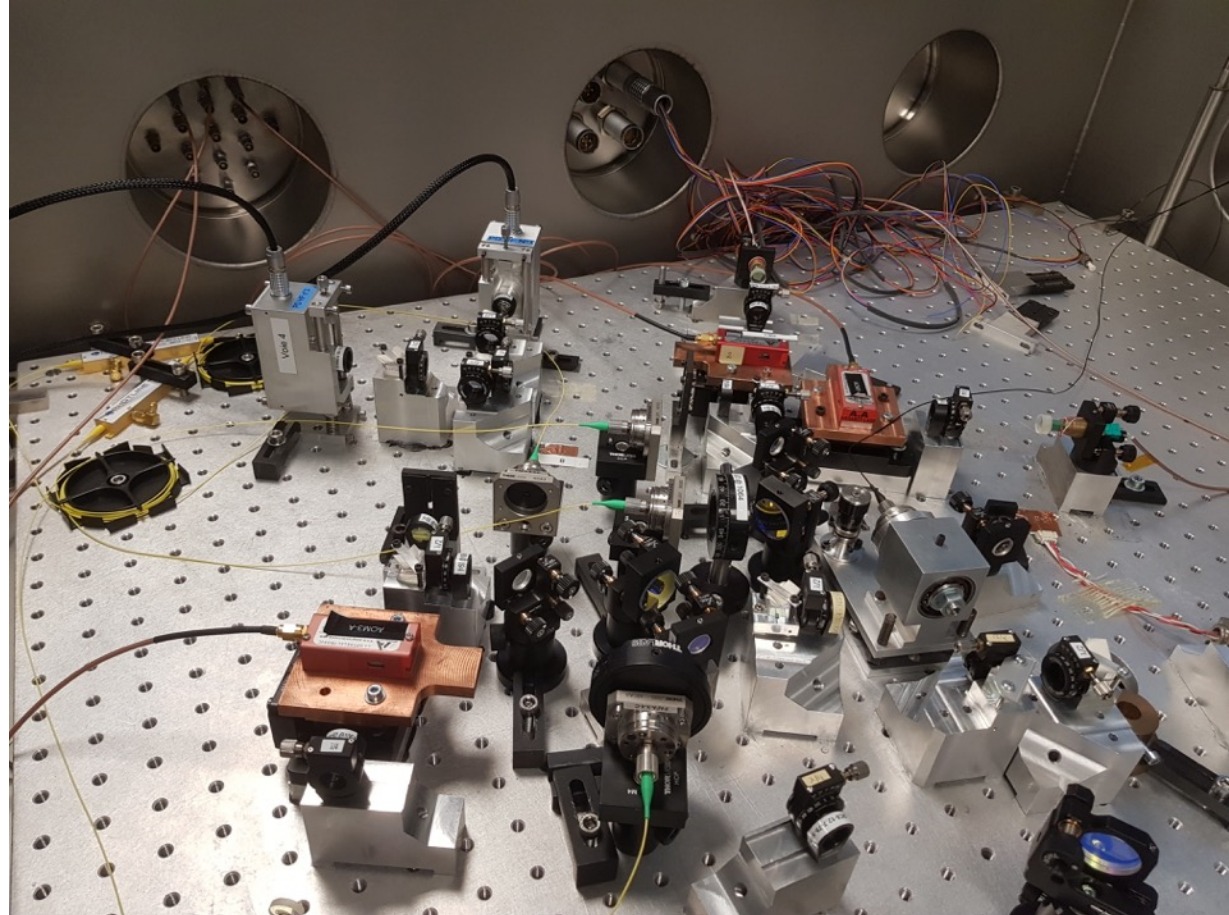
**Installation of the LOT
in the vacuum chamber**



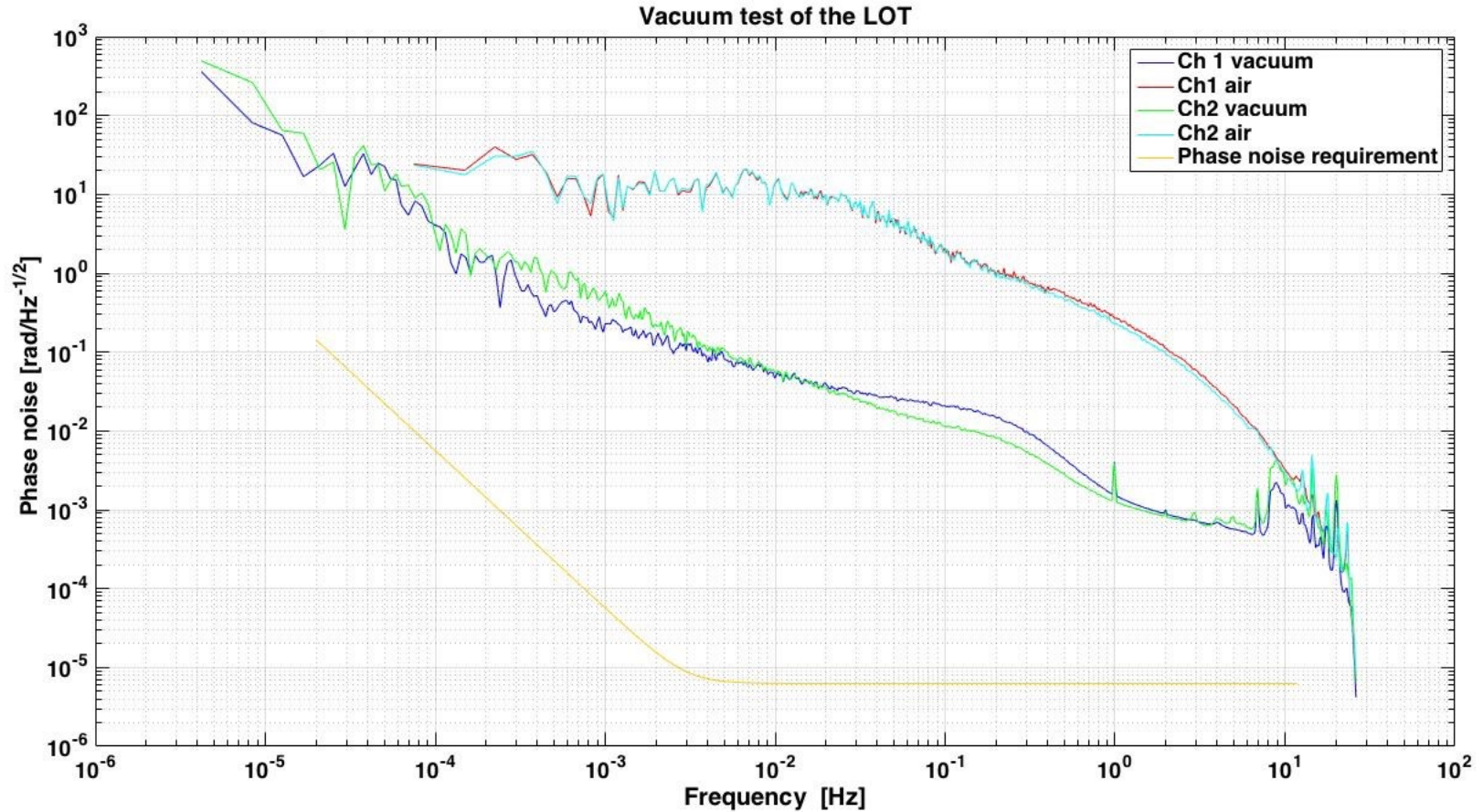
What has been done

Realignment of the LOT

Restarting of the optical path length active compensation



LISA on Table: Vacuum test



LISA on Table: what is next ?

- Operating the LOT with the signal generation system (DDS)
- New simulations to test TDI (Doppler effect)



Thank you!