

Prezentacija opreme Grupa za kvantne tehnologije

Quantum technologies group

Institute of Physics, Zagreb

Home Projects ▾ Publications ▾ People Gallery

New Imaging and control Solutions for Quantum processors and metrology

Frequency comb cooling of atoms

Rubidium vapor EIT quantum memories

Probing of cold rubidium atoms with femtosecond pulses

Synthetic Lorentz force for atoms and photons



CAL T

CENTRE
FOR ADVANCED
LASER TECHNIQUES



HRZZ
Hrvatska zaklada
za znanost



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Croatian Science
Foundation



J. Toro joined our group as a PhD student

2023/03/29 - Nice having you with us!

Domagoj Kovačić successfully defended his PhD thesis

2023/03/14 - Congratulations, Dr. Kovačić!

F. Šimić joined our group as a PhD student

2023/03/01 - Welcome aboard!

Mateo Kruljac successfully defended his PhD thesis

2022/12/16 - Congratulations, Mateo Kruljac!

M. Đujić joined our group as a PhD student

2022/11/03 - Welcome aboard!

Danijel Buhin successfully defended his PhD thesis

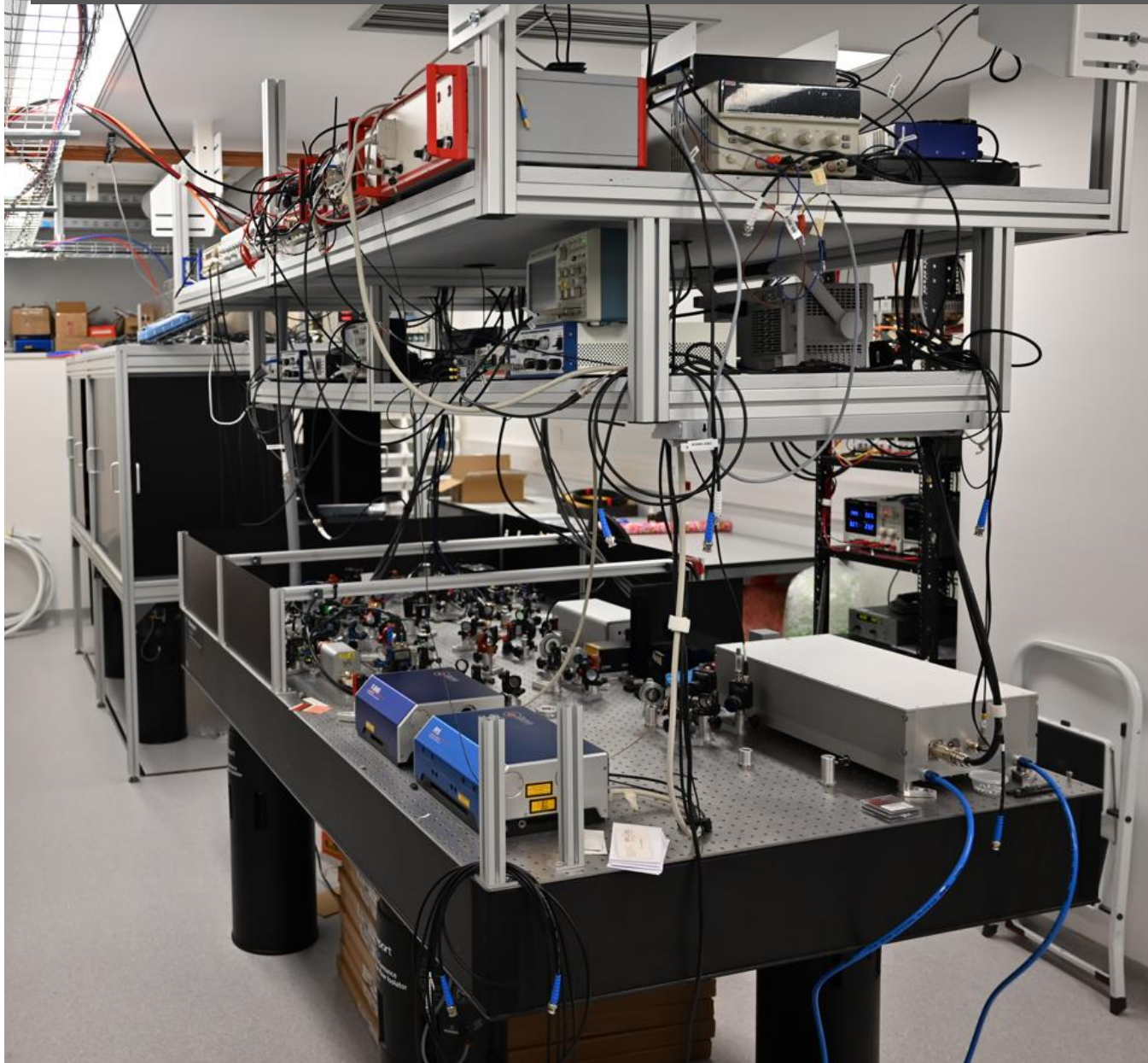
2022/10/28 - Congratulations Dr. Buhin!



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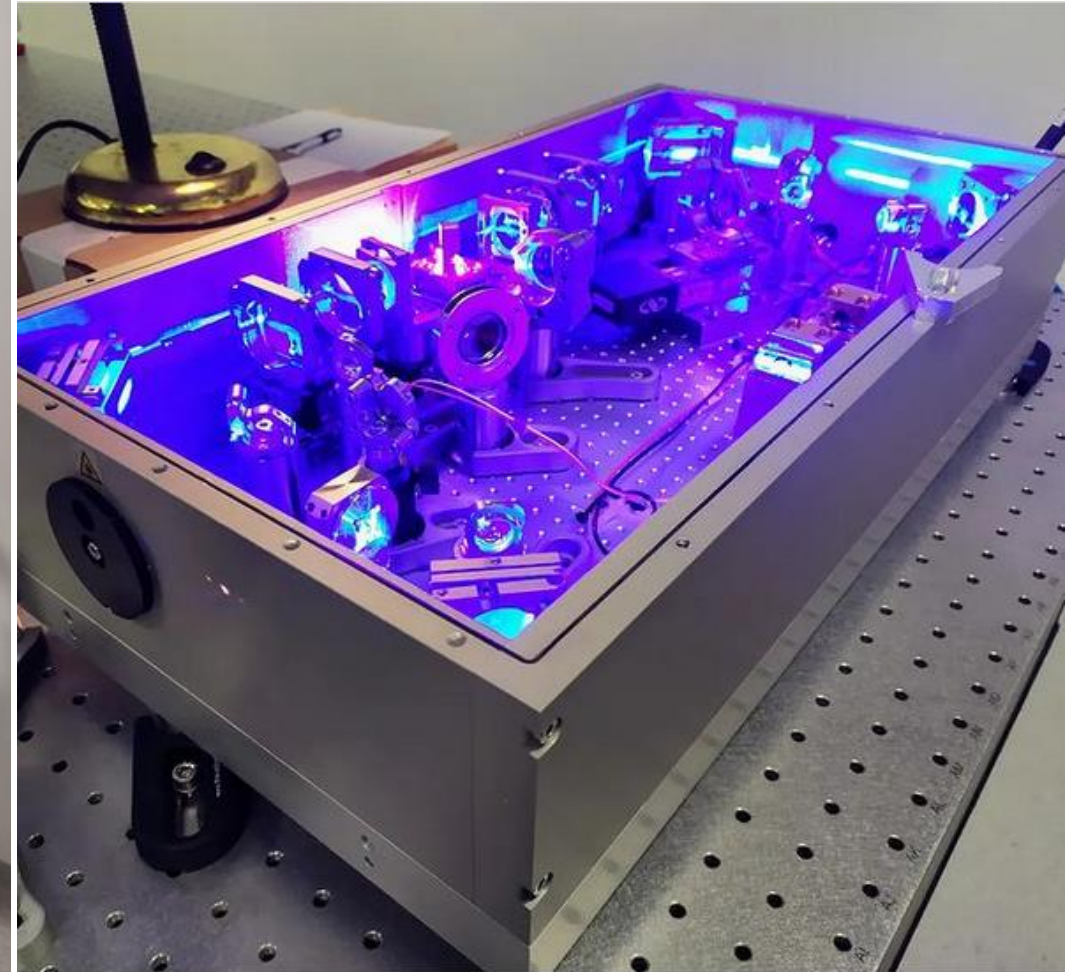


Hladni atomi Rb zarobljeni u periodičnom optičkom potencijalu

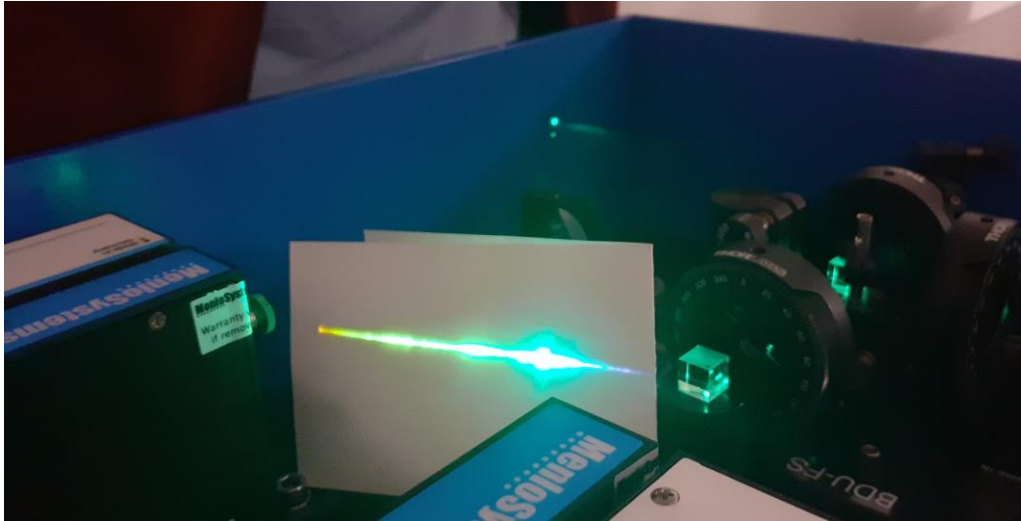


Idealna eksperimentalna platforma za simulaciju problema mnoštva tijela sa dugodosežnim interakcijama.

- visoko stabilizirani diodni lasera @780 nm
- optički frekventni češalj
- ps Ti:Sappire laser
- elektronika, visoki vakuum, optika



Mjerenje optičkih frekvencija



FC1500-ULNnova Optical Frequency Combs

Product

Options

Application

450-2000



Specifications

Advanced Features and Benefits

- lowest phase noise of <math><100 \text{ mrad}</math> [100 Hz-2 MHz]
- high bandwidth >1 MHz actuators for CEO and repetition rate
- fully fiber-coupled CEO frequency generation
- turnkey metrology system, fully automated including data evaluation software
- designed for continuous operation

ORS-Compact Ultrastable Lasers

Product

Options

Data

Applications



Specifications

Advanced Features and Benefits

- Compact high-performance system
- Excellent phase noise and frequency stability
- Field-deployable (rigid cavity mounting)
- Highly customizable—available over wide range of wavelengths and with many options
- Robust and well-engineered single 19" rack system including monitor & control system and vibration isolation platform
- Automated laser locking—24/7 operation

CIPM recommended values

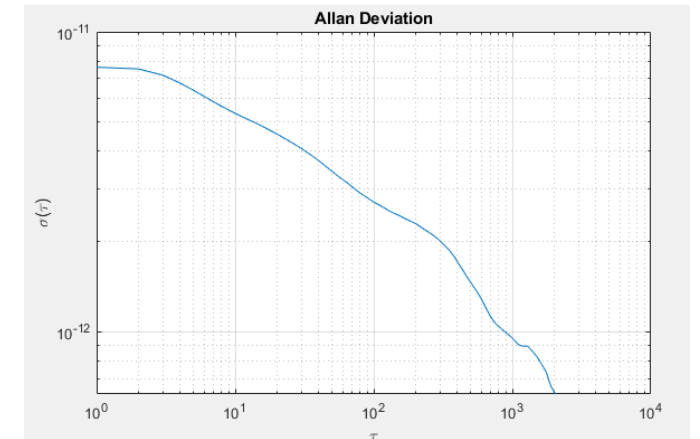
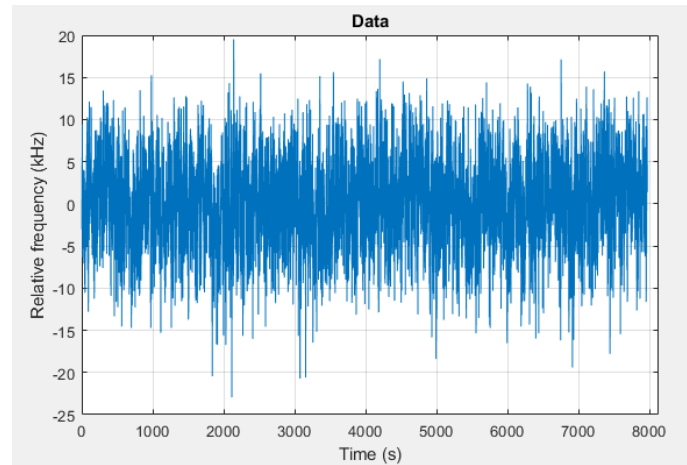
The values $f = 473\,612\,353\,604$ kHz
 $\lambda = 632\,991\,212.58$ fm

with a relative standard uncertainty of 2.1×10^{-11} apply to the radiation of a He-Ne laser with an internal iodine cell, stabilized using the third harmonic detection technique, subject to the conditions:

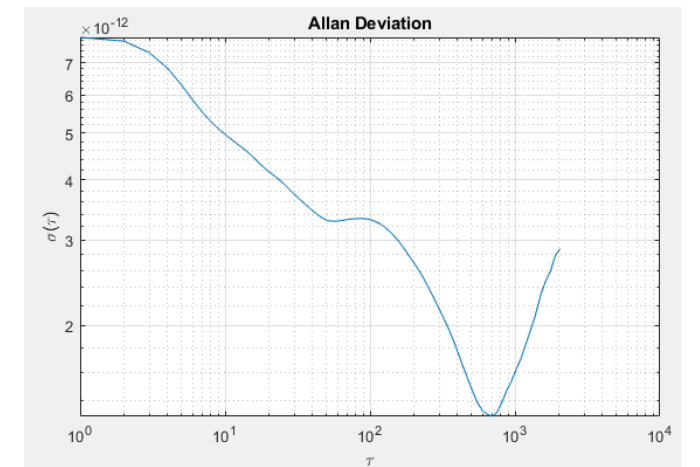
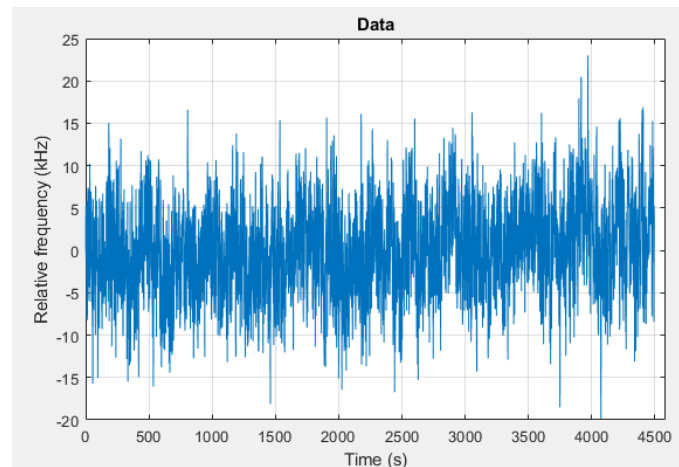
Mjerenje frekvencije HeNe lasera

Mjerenja: Marin Đujić

line – „f” (473612353593 kHz)
measured frequency = (473612353591 ± 5) kHz
difference = -2.429 kHz
ADEV = $6 \cdot 10^{-13}$ @ 2040 s, $5 \cdot 10^{-12}$ @ 10 s



line – „e” (473612366956 kHz)
measured frequency = (473612366959 ± 5) kHz
difference = 3.820 kHz
ADEV = $1 \cdot 10^{-13}$ @ 700 s, $5 \cdot 10^{-12}$ @ 10 s

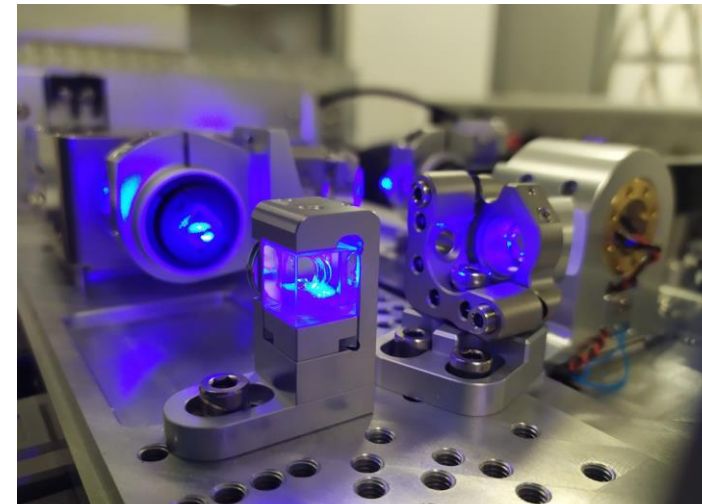


Visoko razlučiva spektroskopija



Poluvodički ECDL laseri

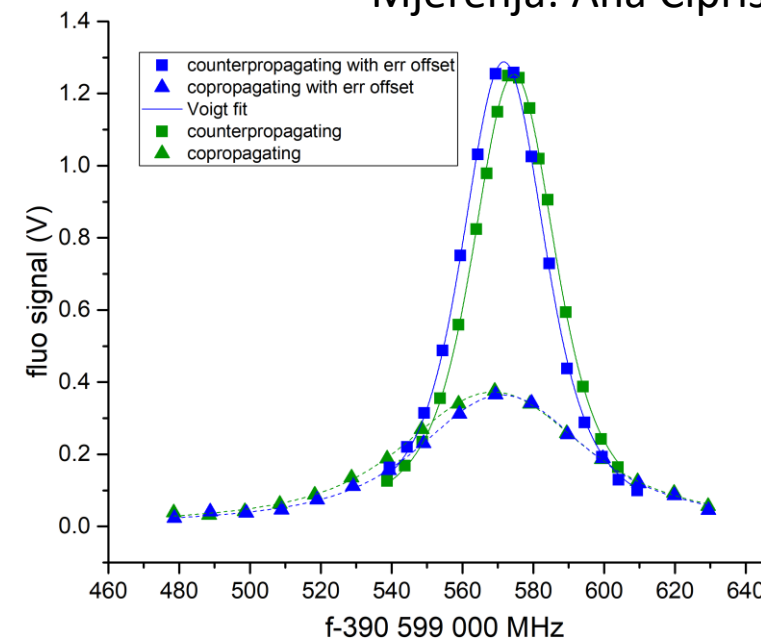
- 460 nm, 689 nm, 698 nm, 679 nm, 707 nm
- snage 50-200 mW
- spektralna širina 500 kHz



cw Titan:safir laserski sistem

- 680-800 nm i 750-900 nm
- snaga 1-3 W
- Spektralna širina 4 MHz

Mjerenja: Ana Cipriš

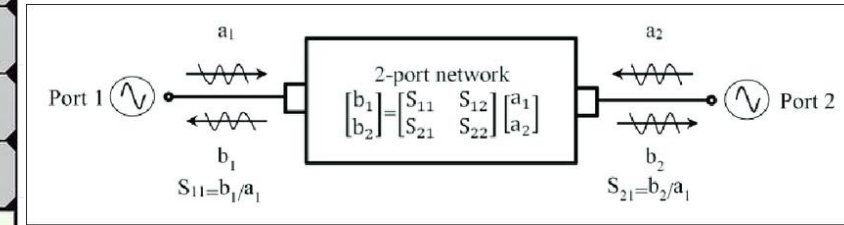


Uređaji za analizu i kontrolu svjetlosti i električnih signala



Anritsu MS2036C
 Vector network analyzer 5 kHz – 6 GHz
 Spectrum analyzer 9 kHz – 9 GHz

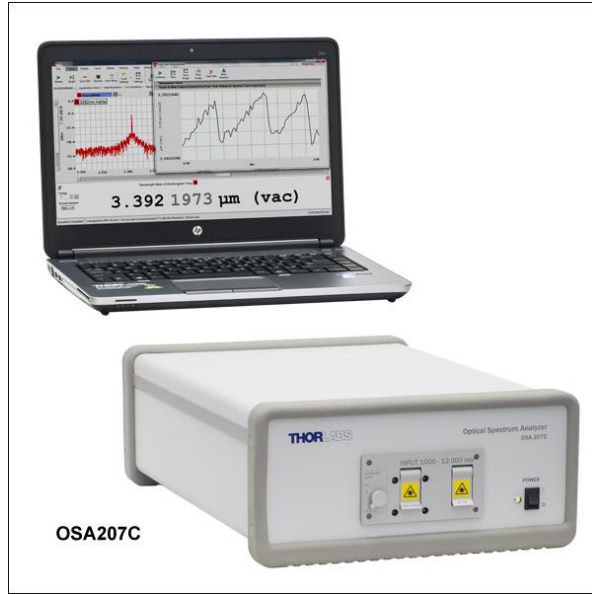
➤ Mjerenje S matrice



Višekanalni pojačani arbitrary function generatori

- Do 400 MHz snaga 4W, time step 4 ns
- Do 8 GHz snaga 20 dBm

Uređaji za analizu i kontrolu svjetlosti i električnih signala



Optički spektralni analizatori:

- OSA201C: 350 - 1100 nm
- OSA207C: 1.0 - 12.0 μm
 - Spektralna rezolucija 7.5 GHz

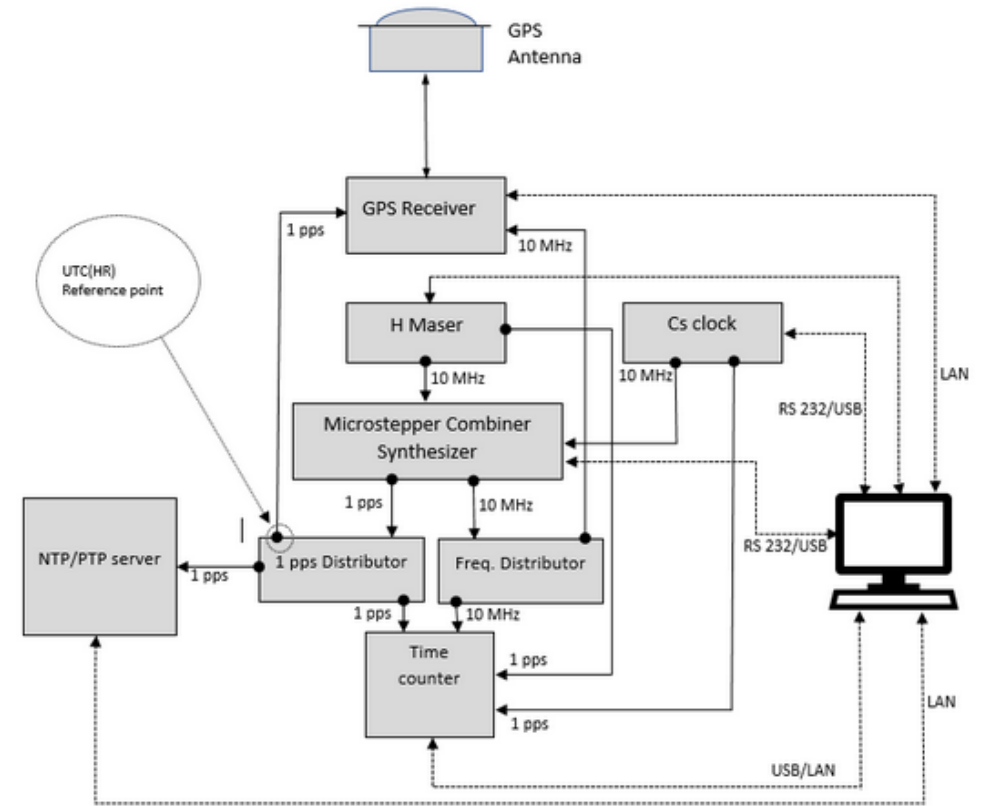
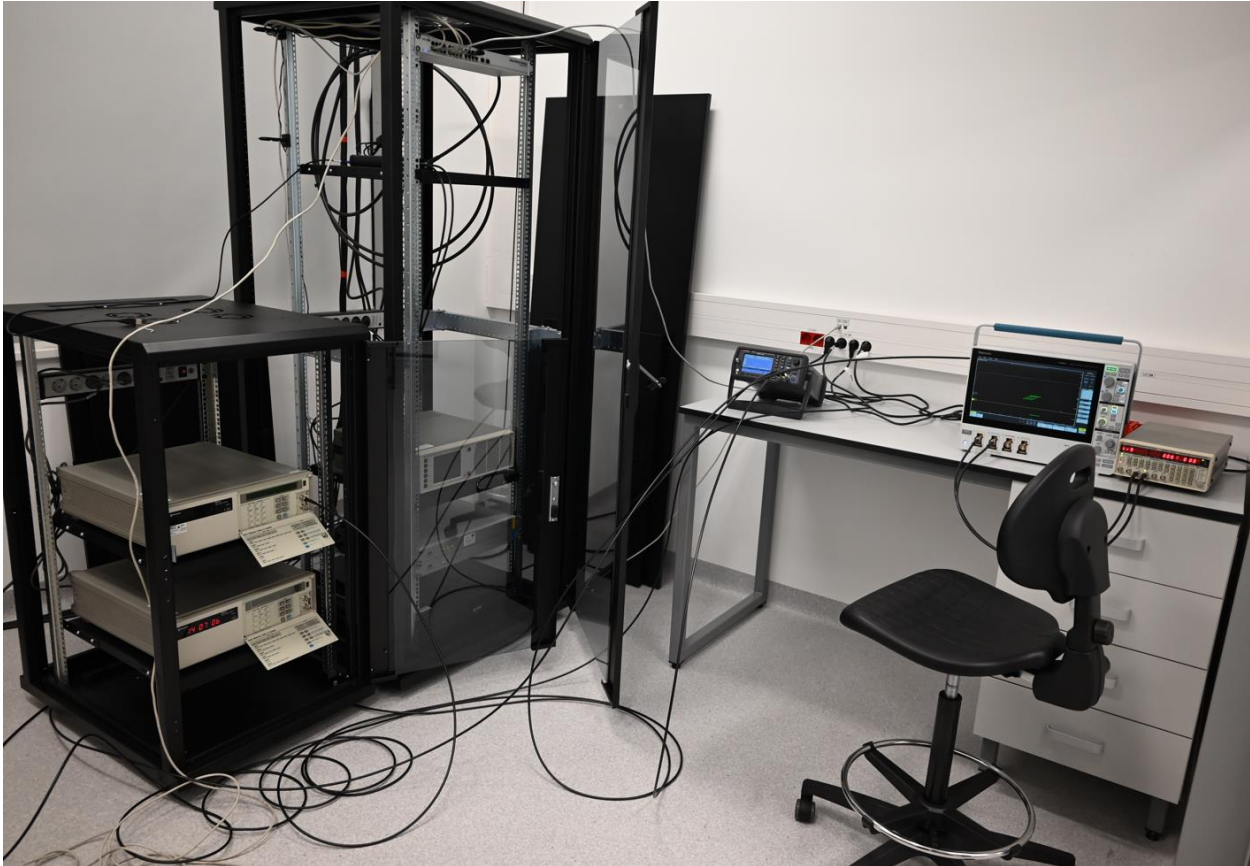


High Precision Wavemeter WS-100

- 100 MHz točnost
- Osjetljivost 2 MHz

Nacionalni laboratorij za vrijeme i frekvenciju

- nacionalno hrvatsko vrijeme
- umjeravanje instrumenata s frekventnom i vremenskom bazom
- isporuka točnih i preciznih 10 MHz i pps signala



Optički atomski sat

