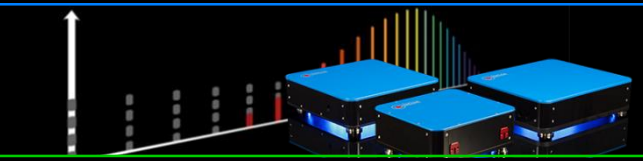
TOPTICA PHOTONICS

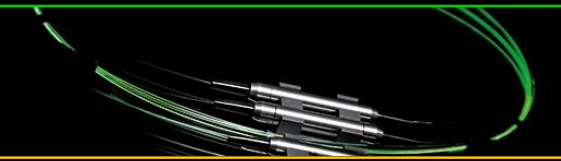
All Wavelengths.
190 nm - 0.1 THz

QT flagship and beyond – TOPTICA's activities for Quantum Computing

Dr. Ulrich Eismann

Product Manager NLO, QT business unit





TOPTICA Group: Key Figures

All Wavelengths.
190 nm - 0.1 THz

Key Figures

Employees	~320
Revenues	~74 Mio € (82 Mio $)
Founded	1998

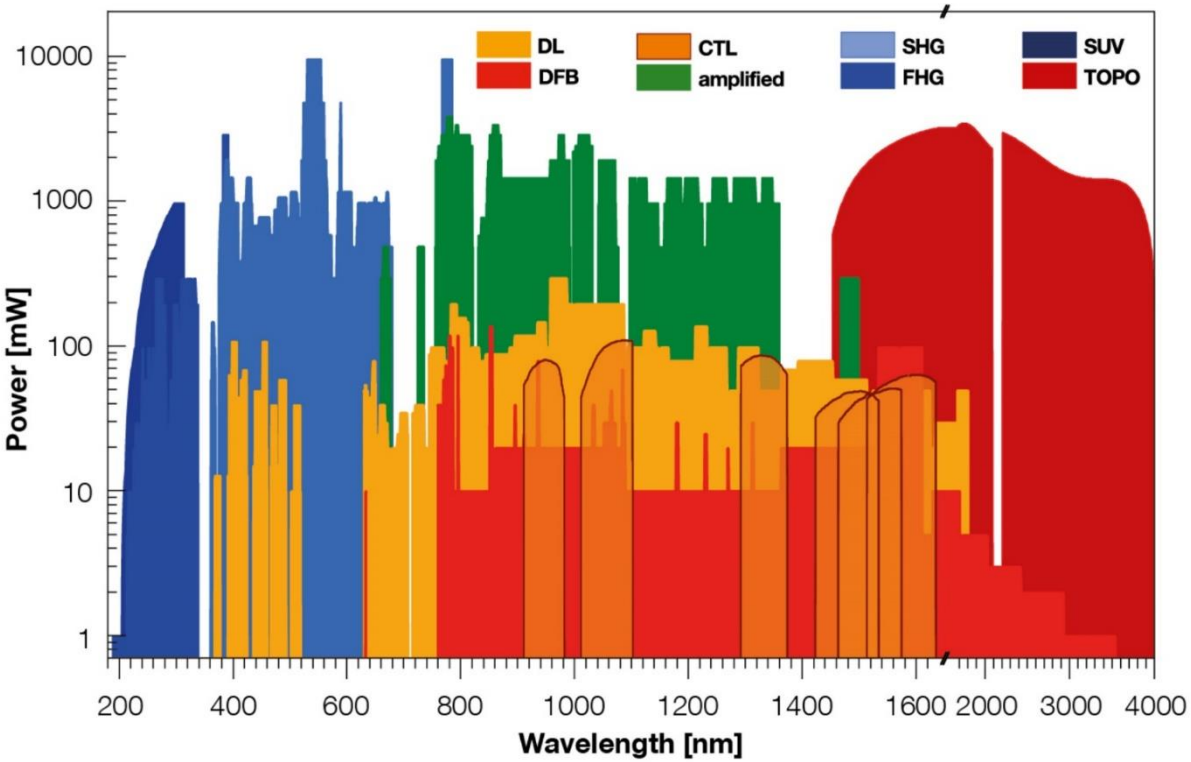
Technology

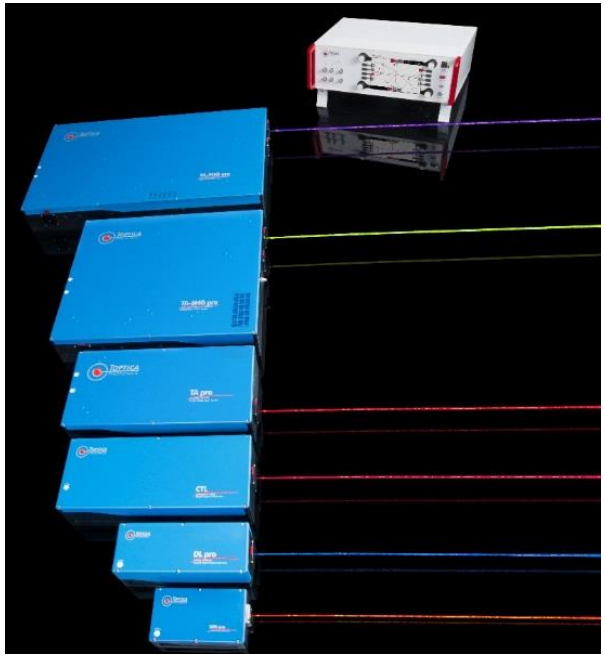
Diode Laser Systems	**190 – 4000 nm**
Ultrafast ps/fs Fiber Lasers	488 – 2200 nm, 5 – 15 µm
Frequency Combs	**420 – 2200 nm**
Terahertz Systems	0.1 – 6 THz

Quantum Shovels

Tunable Diode Lasers for Optical Clocks & Quantum Sensors

All Wavelengths.
190 nm - 0.1 THz





Difference Frequency Comb – Compact, Robust, High-end

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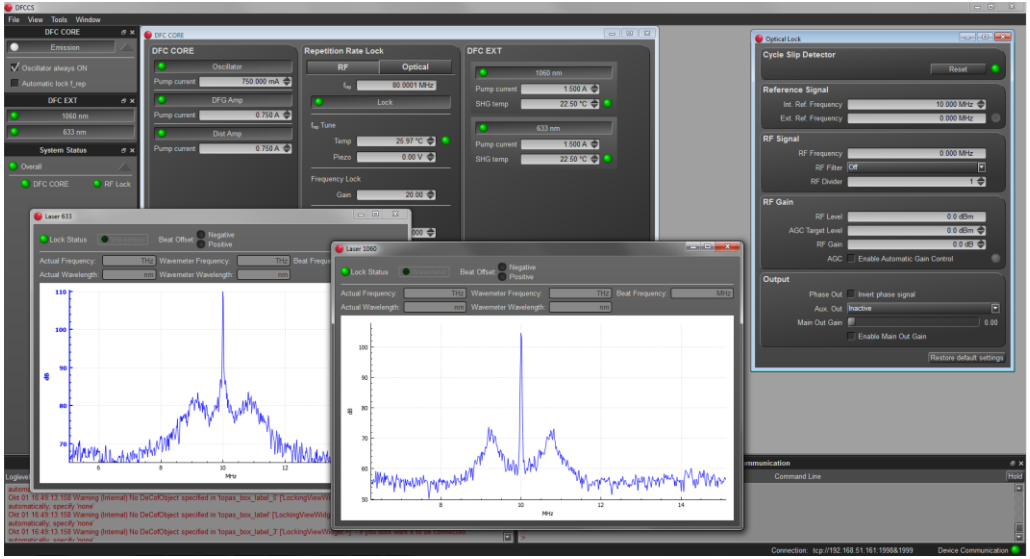
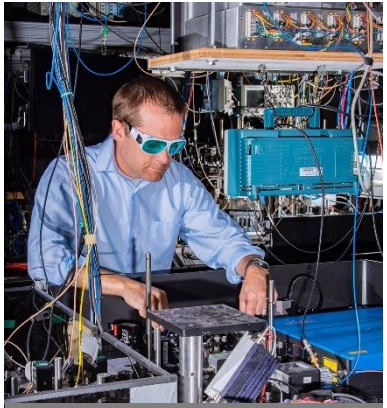
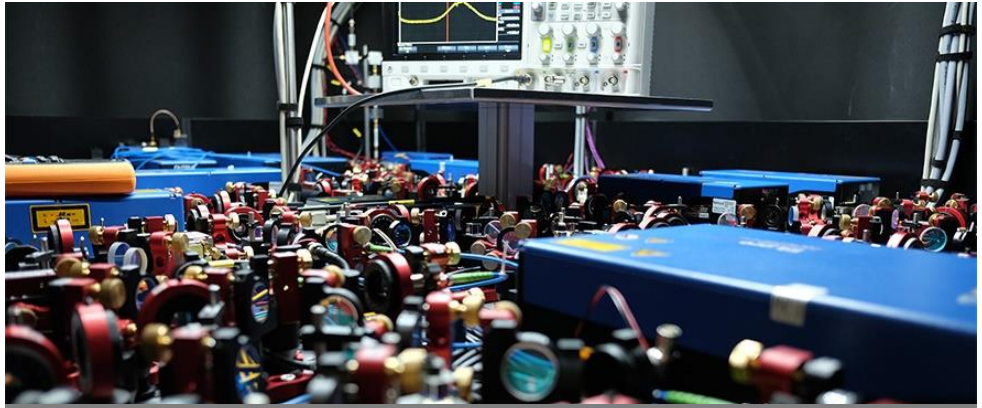


- CERO technology: f_{ceo}-free (zero f_{ceo})
- Wavelenght extensions: 420 – 2200 nm
- Full software control: remote & convenient

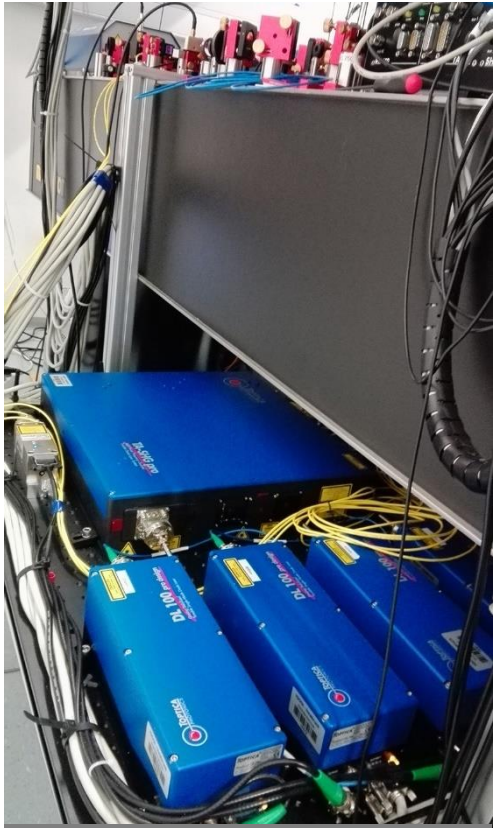
TOPTICA Lasers in World-leading Labs



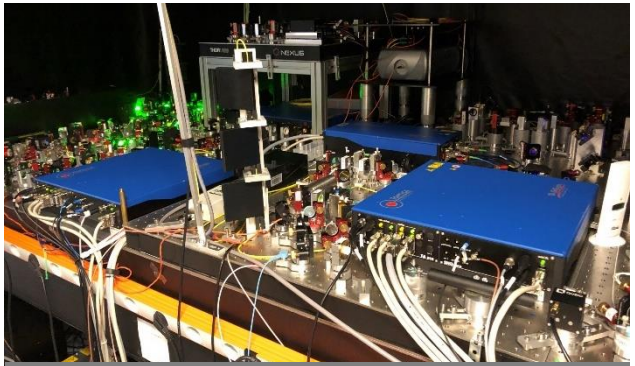
Ludlow lab, NIST Boulder



Schneider lab, University of Cambridge



Blatt lab, Innsbruck



Sengstock lab, Institut für Laserphysik, Hamburg

Sengstock lab, Institut für Laserphysik, Hamburg

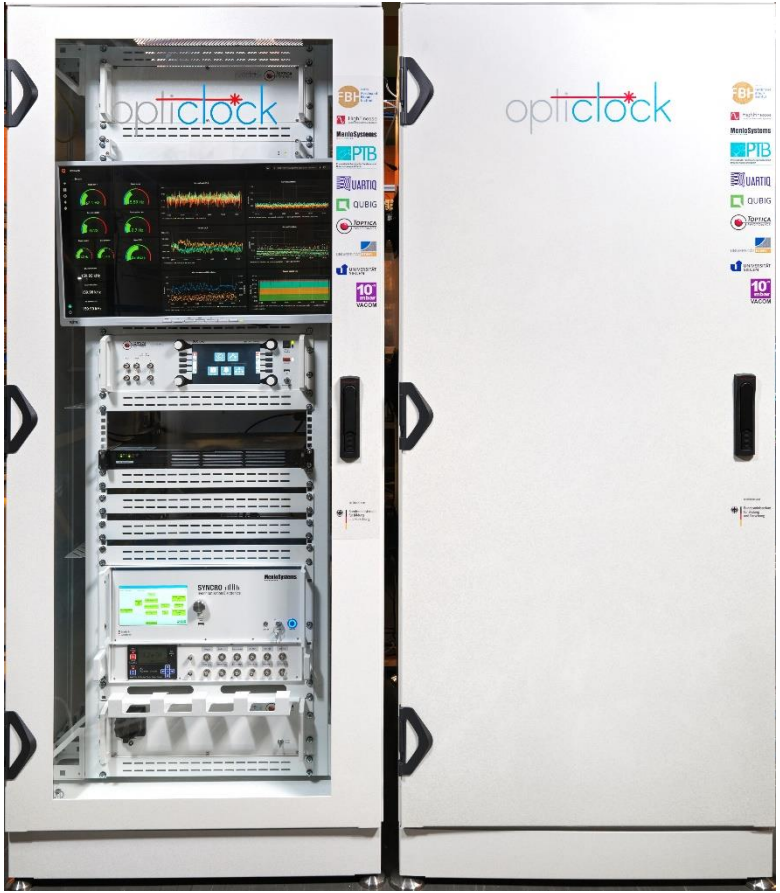
Laser Rack Systems

All Wavelengths.
190 nm - 0.1 THz

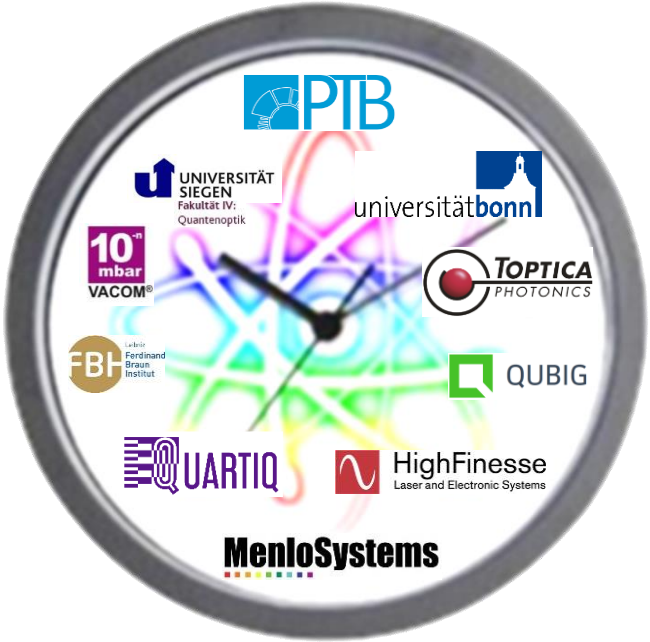
Key Features

- Rack-mountable & rack-mounted diode laser and frequency comb modules
- Fiber-coupled, polarized optical output of 330 .. 1625 nm
- Extensively tested and qualified
- Convenient remote control & frequency locking
- **Complete Quantum Technology Solutions**

Systems Engineering Competence



Optical single $^{171}Yb^{+}$ ion clock



Federal Ministry of Education and Research

TOPTICA on board of the EU Quantum Technologies Flagship

QUANTUM FLAGSHIP

Communication

Quantum Communication

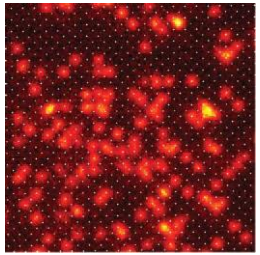
QIA - Quantum Internet Alliance

Computation

Quantum Computing

AQTION- Advanced Quantum Computing with Trapped Ions

Simulation



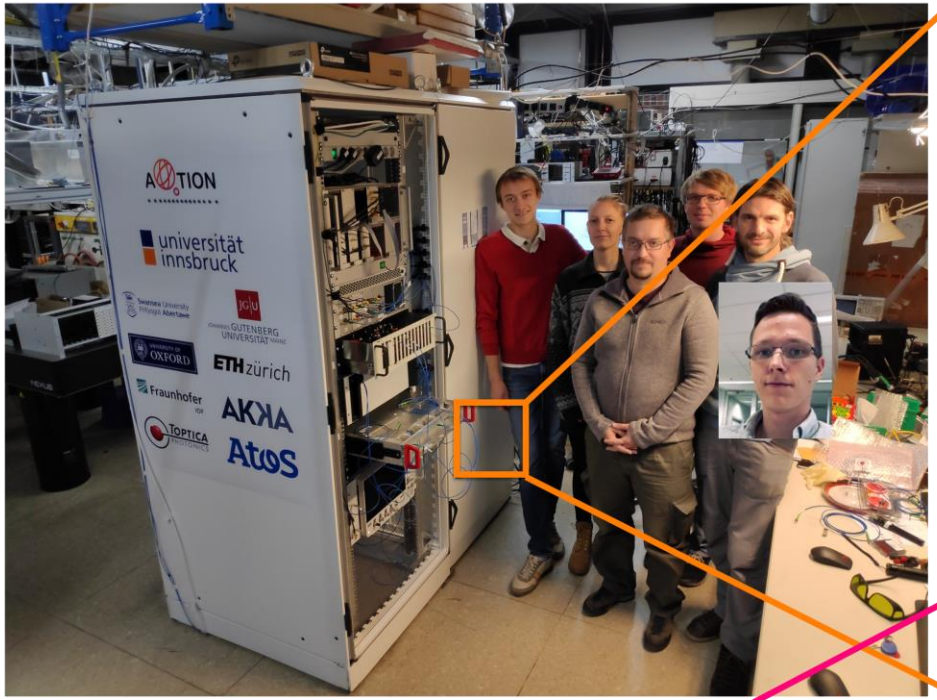
Quantum Simulation

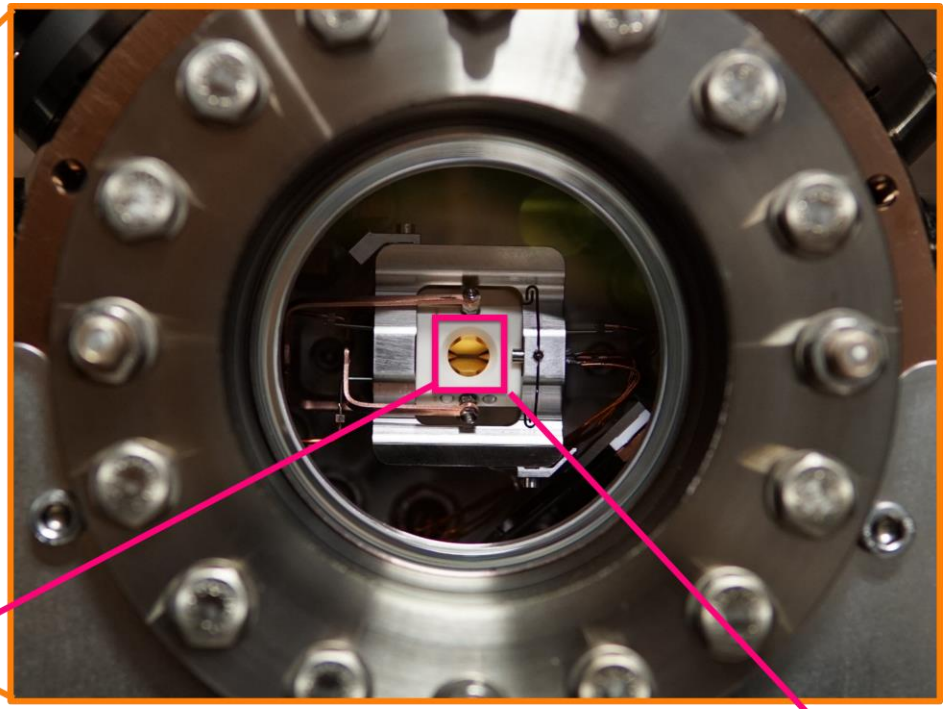
PASQuanS - Programmable Atomic Large-Scale Quantum Simulation

Sensing/Metrology

Q Sensing & Metrology

iqClock
Integrated Quantum Clock





50 ion-qubits loaded