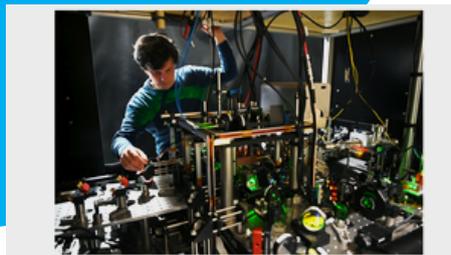


# Advanced Quantum Computing Technologies: Optical Tweezers, Quantum Optical Cells, and Neutral Atom Qubits

A suite of groundbreaking technologies enhancing quantum computing capabilities through innovative optical tweezers, specialized quantum optical cells, and neutral atom qubit manipulation.

- Increased precision and flexibility in quantum state manipulation.
- Enhanced control over electric fields in quantum measurements.
- Improved qubit connectivity and functionality in quantum computing systems.



## Fields of application

Quantum computing, quantum information processing, advanced scientific research in quantum mechanics, and potential applications in cybersecurity and data encryption.

## Background

These technologies represent significant advancements in quantum computing, addressing key challenges in manipulating quantum states for enhanced computing power.

## Problem

Existing quantum computing systems face limitations in precision and control, especially in manipulating Rydberg atoms and quantum states.

## Kontakt

Dipl.-Ing. Julia Mündel  
TLB GmbH  
Ettlinger Straße 25  
76137 Karlsruhe | Germany  
Telefon +49 721-79004-0  
muendel@tlb.de | www.tlb.de

## Entwicklungsstand

TRL3

## Patentsituation

CN 202 180084144.8 pending  
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US 18/267,066 pending  
EP PCT/EP/2021/084363 pending  
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EP 21 211 024.1 pending  
US 18/530,288 pending  
EP 22 211 813.5 pending

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## Service

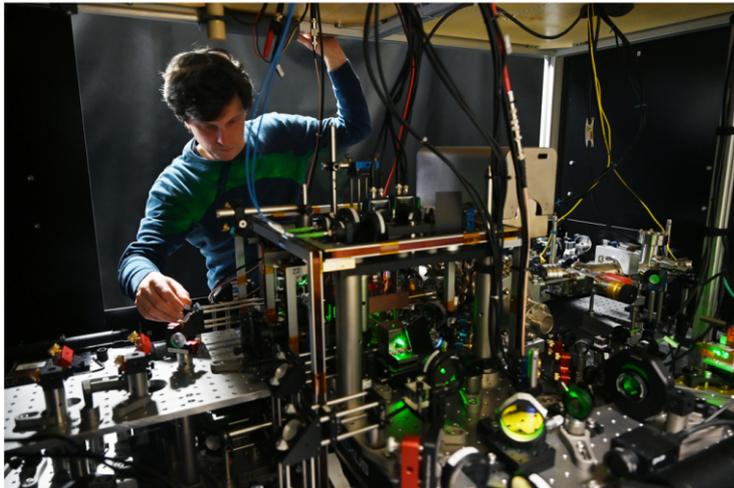
TLB has been entrusted with the commercialisation of this pioneering technology and is looking for investors for further development up to market maturity

## Solution

The key innovation pertains to a quantum computing device utilizing neutral atoms, specifically in the field of quantum computing using neutral atoms as qubits. The technology is an advancement over conventional quantum computing systems which use ionic qubits or superconductive qubits.

The main technological steps for the implementation of the quantum computing system are:

- Neutral atom qubit device for improved qubit manipulation and connectivity.
- Optical tweezers using acousto-optic deflectors for dynamic atom manipulation.
- Quantum optical cell with transparent, conductive electrodes for precise electric field control.



Current setup of the quantum computer in the Stuttgart University laboratory [Photo: Patrik Pfeiffer].