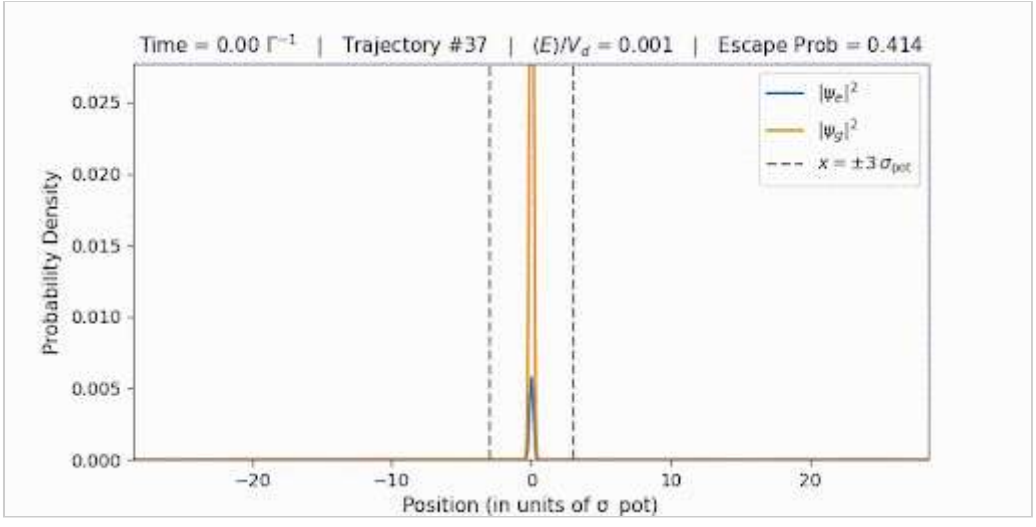
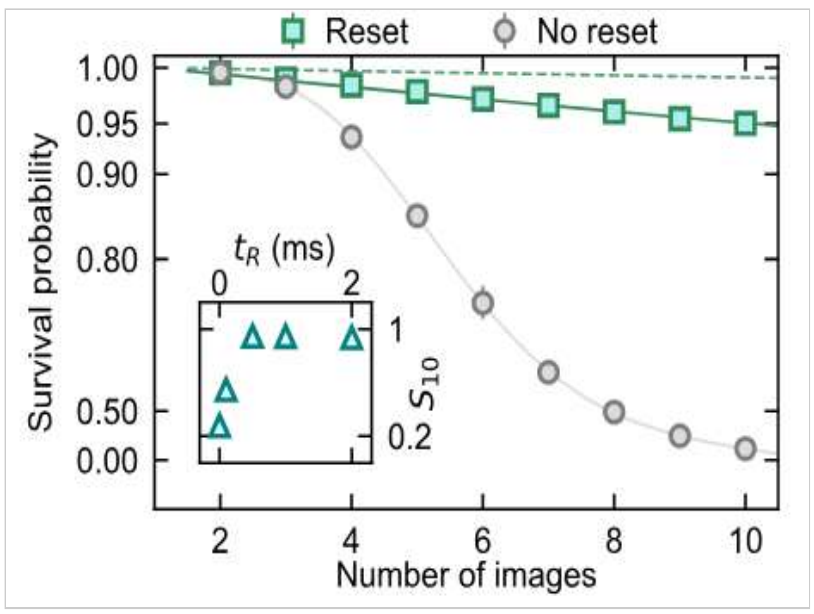
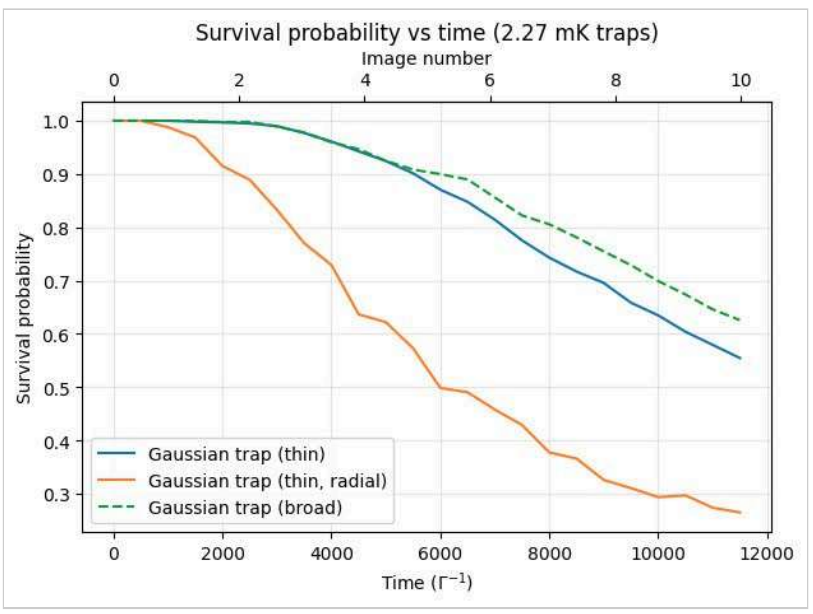
Research experiences in neutral-atom systems

Master's Project: Evolution of neutral atoms in optical tweezers under resonant imaging



Evolution of a marginally trapped atomic wavepacket ($E \approx V_d$) in an optical dipole trap.

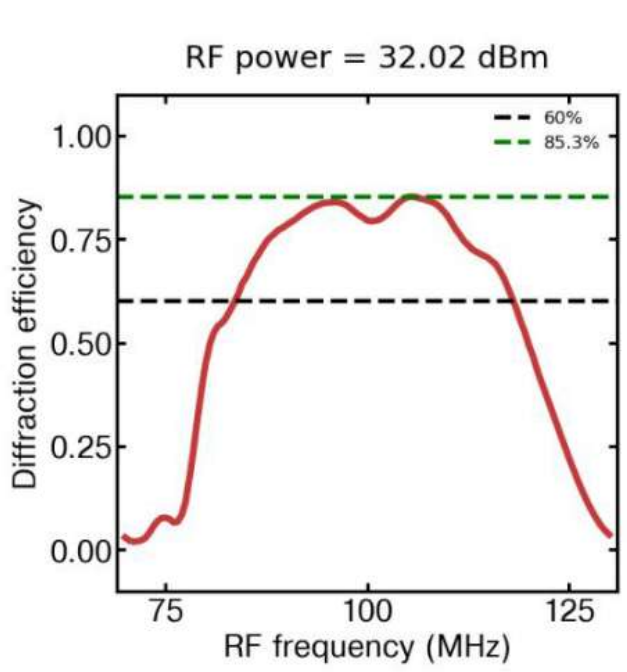




Loss probability comparison of imaged Yb atoms. Left: Falconi *et al.*, PRL (2025). Right: Simulation results.

Summer @ Rb Quantum Simulator lab

Aligned the array with respect to laboratory reference using a real-time Python script.

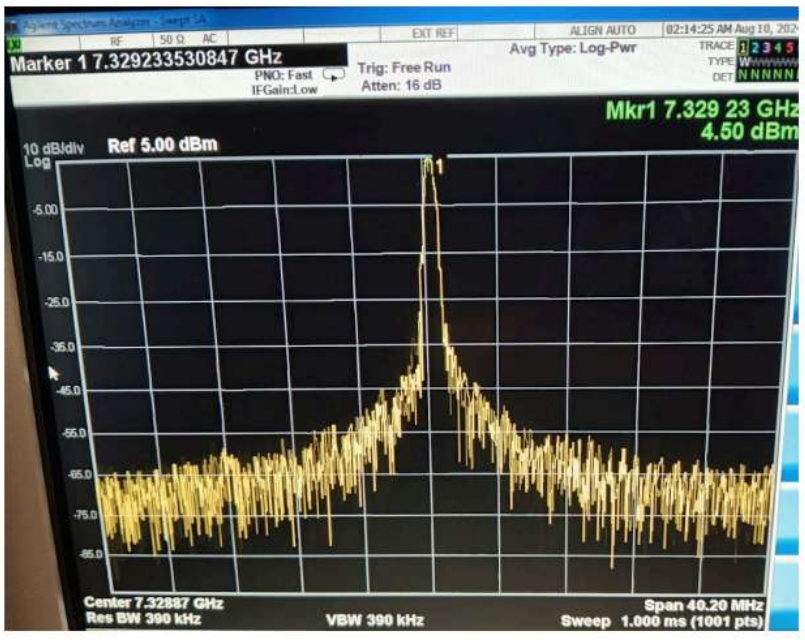


AOD Diffraction efficiency curve

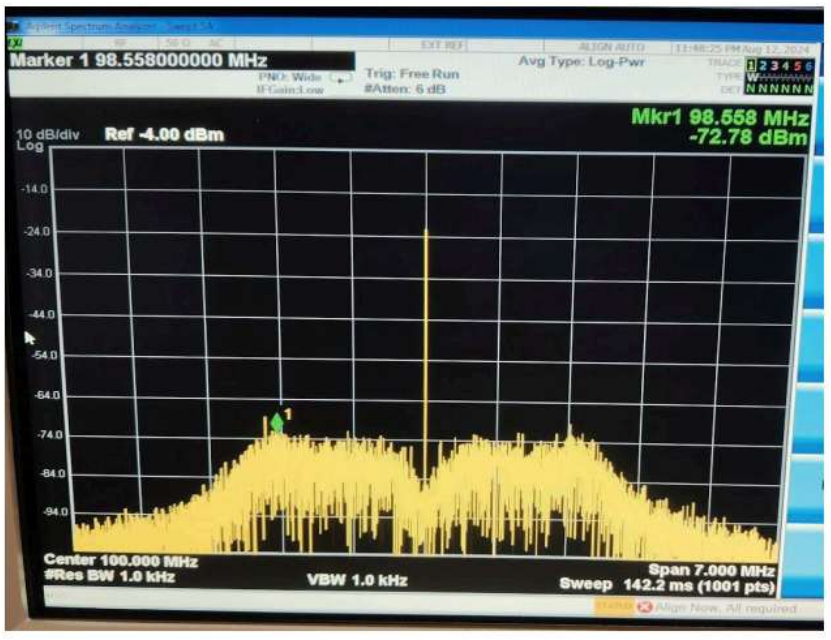
Optical tweezers of the Raman laser generated using an AOD (left). optimized diffraction efficiency curve (right).

Summer 2024 - IQC Waterloo

1. Locking the Raman Lasers at 6.83GHz using Optical PLL

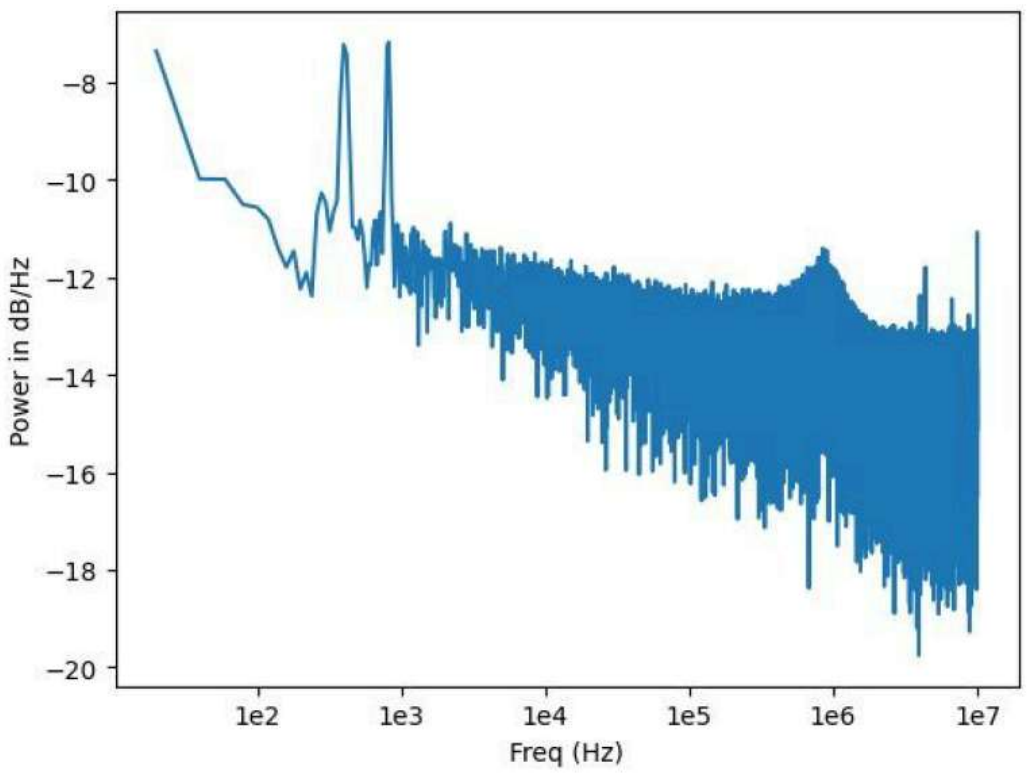


Optical Beat signal (Pre-Lock)



Optical Beat signal (Post-Lock)

Laser lock spectrum of Raman lasers using an Optical Phase-Locked Loop.



Phase Noise spectrum (reveals vibrational sources in the lab)

Phase noise spectrum of the lock.