

Motivation

We are trying to implement a technique to realize a full quantum control over an atomic system. Neutral atoms are laser-cooled and trapped with a tight & stable confinement of magnetic field of supercurrent. Quantum controls over the trapped atoms with laser beams pave a way to realize a quantum device with neutral atoms.

Originality

We have demonstrated an outstanding stability of our persistent supercurrent atom chip, which we have achieved in 2006 for the first time in the world. We have also achieved an evidence that the magnetic flux penetrated in the superconducting thin wire has specific influence in the trapping stability.

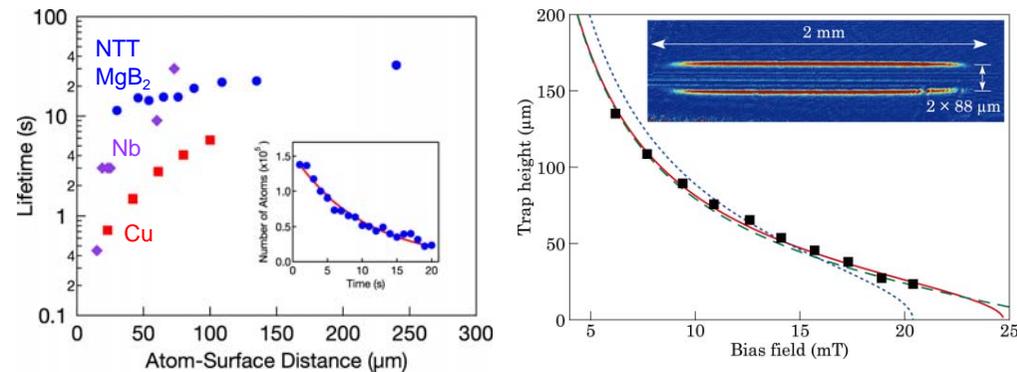
Impact

The quantum device with neutral atoms will be a practical resource for applying quantum mechanics to our daily life. With the atomic devices high precision interferometric measurements, quantum state transfers, and quantum computations are expected to be realized.

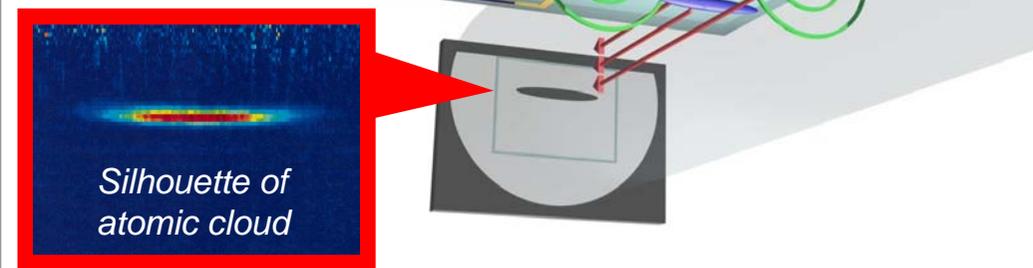


Persistent Supercurrent Atom Chip

We have demonstrated an improvement in trapping stability of magnetic micro traps with persistent current.



We have also found an influence of magnetic flux penetrated in the superconducting wire.



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