

Development and characterisation of an opening mechanism of a MEMS atomic source for use in quantum computers

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Arbeitsinhalt

The aim of Quantum Valley Lower Saxony is to realise a 50-qubit quantum computer based on ion trap technology by the end of 2025. A core component of this quantum computer is the atom source, which ensures the controlled supply of vapour phase atoms of a specific atomic species for the quantum computer. For this and also for other applications in the field of quantum sensor technology, a MEMS system is to be developed that is characterised by miniaturisation and production using microtechnological processes. One challenge here is the reactivity of the required elements, which oxidise even on slight contact with air and thus become unusable. The atom source must therefore encapsulate the material to be vaporised in an oxygen-free environment during production, storage and transport. Only when it is installed in the vacuum system of the quantum experiment should it be opened in a controlled manner. After opening, the atomic species should finally be brought into the vapour phase in a controlled manner, for example using an integrated microheater.

The aim of this work is to develop a MEMS atom source. The focus of this work is on the controlled opening mechanism, so that the reactive material inside the atom source does not come into contact with air during storage and installation and is only opened after pumping and heating in the vacuum chamber.

Art der Arbeit

Master thesis

Voraussetzungen

- Independent, structured and autonomous way of working
- Knowledge in the field of microsystems technology

Starttermin

As of now