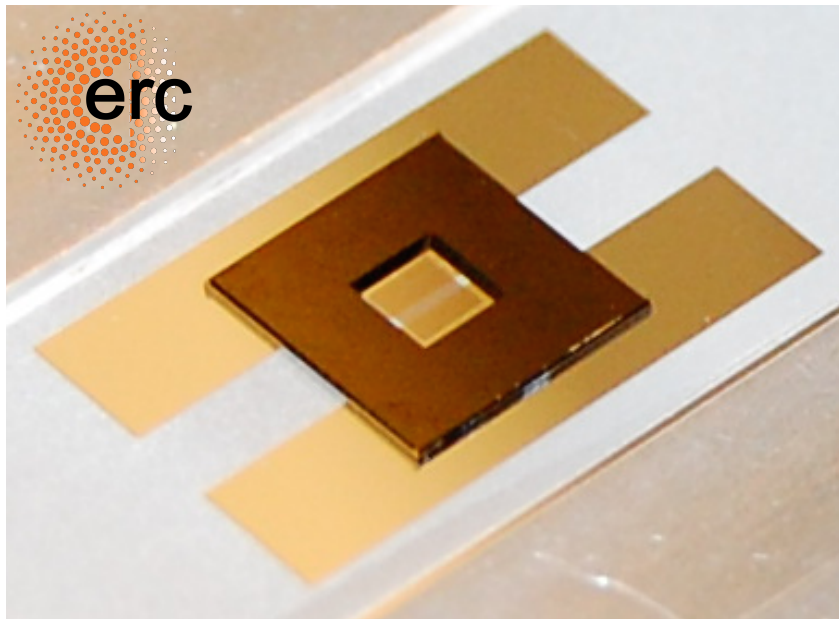


*PhD and Postdoc positions available in the SteeleLab at the
Kavli Institute of Nanoscience Delft:*

Macroscopic Quantum Superpositions using Quantum Optomechanics in 3D



As part of the ERC consoladator grant Quantum Optomechanics in 3d (QOM3D), the SteeleLab has PhD and Postdocotoral Researcher positions available to work on building macroscopic quantum superpositions using 3D quantum optomechanics.

In this project, you will aim to build quantum superpositions of a millimeter-sized, macroscopic object. The object you will work with is a 1x1 mm silicon nitride membrane that you can see in the middle of the chip in the image above. In this project, you will use quantum microwave light to “push” both upwards and downwards on the membrane at the same time, bringing this macroscopic object into a quantum superposition of being in two places at the same time.

To do this, you will work in a team on a new quantum optomechanical platform based on high Q-factor 3D superconducting microwave cavities. Due to the extreme coherence possible with these cavities, your experiments will enter into a new regime of optomechanics where the membrane becomes sensitive to the force exerted by a single photon.

Developing tools based on superconducting qubits and Josephson junctions, you will create quantum microwave sources, and shine this “quantum light” onto the membrane to bring the object containing more than 10^{15} atoms into a quantum superposition. In addition to applications such as quantum transducers and quantum memories, the long coherence of the motion of the membrane will enable you to enter a regime where gravity could begin to influence the evolution of the quantum superposition, and explore the effect of gravity on quantum mechanics, one of the last open frontiers in quantum physics.

To apply, please prepare an application that includes a CV, BSc. and MSc. transcripts, a motivation letter, and a list of people who could provide letter of reference. Your application should be submitted by email to Prof. Gary Steele, <g.a.steele@tudelft.nl>.