

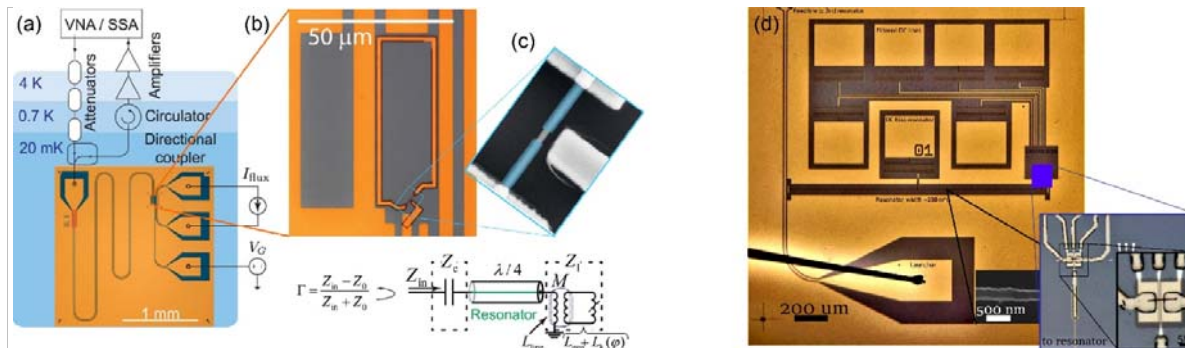
November 2021

Postdoctoral fellow on “Circuit-QED with high-impedance materials”

The **Nano- and Quantum Electronics** group at the **Department of Physics** of the **University of Basel** is welcoming applications for an **experimental postdoctoral** fellowship: www.nanoelectronics.ch.

Our group is taking part in three national and international collaborative projects where **microwave technics** **are** used to control and to measure **quantum systems**, such as “two level” qubits. Target devices are spin-qubits in Si/Ge nanowires and 2DEGs, Andreev spin qubits and related superconducting-semiconducting hybrids, including InAs 2DEGs and van der Waals heterostructures.

We have established the fabrication of such quantum devices and coupled them to **high-impedance superconducting resonators**. Our research focus will be on exploring new approaches to increase the coupling strength between the physical qubit and the resonator. Most recently, we have purchased a Zurich Instrument quantum analyzer system, which we will be using for qubit-type measurements. We are collaborating with various groups in Switzerland, e.g. IBM, ETHZ and EPFL, as well as with international groups from Denmark, France, Germany, Hungary, Italy, Sweden, Spain and The Netherlands and more.



(a-c) An example of a particular device: Here a InAs nanowire, partially coated with Al (c), makes up a Josephson junction which is embedded in a RF-SQUID loop (b) coupled to the current antinode of a $\lambda/4$ resonator made from NbTiN. In (d) a similar nanowire device (inset) is coupled this time through a gate line to the voltage antinode of a $\lambda/2$ resonator (d). Here, the resonator is probed through a feedline to which it is capacitively coupled.

We are looking for a highly motivated and bright physicist who is keen to explore fundamental aspects of **quantum devices** and who has been doing an **experimental PhD work** in the domain of low-temperature quantum transport before.

All members are expected to work in a team and collaborate with other PhD students and postdoctoral fellows within the group and within our network. Start of the project is 1st Jan. 2022. The duration is first set to one year with the provision for an extension for a 2nd year. **Requirement:** you need to have a **profound understanding of quantum and solid-state physics**, have done a **PhD work in the field of low-temperature quantum transport**. You should be skilled in micro- and nanofabrication and low signal data-acquisition in cryogenic environment down to Milli-Kelvin temperature using dilution refrigerators. Experience with microwave techniques would be advantageous.

To apply: please email to Christian.Schoenenberger@unibas.ch your *curriculum vitae* including names and contact info of referees and scanned copies of university grades. Please submit a *motivation letter*, in which you explain why this position is what you were looking for, why you are eager to perform experimental lab work and why you are convinced that a postdoctoral fellow is the right next step for you. You should also dwell on your background in solid-state physics and quantum science. I expect that you have a very good background in experimental research and a high level of understanding of solid-state physics, quantum physics and quantum optics.