Seminar MSc 1/2 – Quantum physics

Master Seminar I + II Winter term 2021/22 Tu, 14:15 – 15:45

There's Plenty of Room at the Bottom

Precision Measurements in the Quantum World and its Applications

Supervisors: Proffs. Budker, Fertl, Pohl, Schmidt-Kaler, v. Loock, Walz, Wendt, Windpassinger, with Dres. Laatiaoui, Poschinger, Raeder, Studer, Ulmer, Wickenbrock, Wolf

…"When we get to the very, very small world, say to circuits of seven atoms, we have a lot of new things that would happen that represent completely new opportunities for design. Atoms on a small scale behave like nothing on a large scale, for they satisfy the laws of quantum mechanics. So, as we go down and fiddle around with the atoms down there, we are working with different laws, and we can expect to do different things. We can manufacture in different ways. We can use, not just circuits, but some system involving the quantized energy levels, or the interactions of quantized spins, etc"…. (R. Feynman, talk to the APS, Pasadena, USA, 1959)

Already 60 years ago Richard Feynman predicted the huge potential of quantum systems, which we today precisely explore and apply in the working group QUANTUM at Mainz University. The seminar will cover most recent investigations and applications in the quantum world; it is a joint initiative of all QUANTUM subgroups and the lectures and talks will be supervised individually. The seminar will be organized by Klaus Wendt (kwendt@uni-mainz.de) and Sebastian Raeder (raeder@uni-mainz.de). The approx. 30-40 minutes talks should be given in English. The seminar will take place in presence.

No	Date	Lecturer	Topic	Supervisor, double talks
0	19.10.21		*Free*	
1	26.10.21	Klaus Wendt	Introduction to presenting a seminar	Wendt
2	02.11.21	Raphael Hasse	Atomic and nuclear clocks for precision metrology	Raeder
3	09.11.21	Felix Herrmann	Quantum chaos in complex atoms	Wendt, Studer
4	16.11.21	Anna Liedtke	Investigating parity violation in atoms	Budker, Wickenbrock
5	23.11.21	Manuel Hagelücken	Studies on the asymmetry between matter and antimatter	Walz, Ulmer
2x6	30.11.21	Isabelle Ali Mehmeti Thorben Niemeyer	Long-distance quantum communication and quantum internet	**2** Van Loock
7	07.12.21	Andreas Westerhoff	Neutrino mass determination	Fertl
8	14.12.21	Andreas Conta	Quantum logic spectroscopy on atomic and molecular ions	Schmidt-Kaler, Poschinger
9	04.01.22	Lena Schumacher	Quantum logic spectroscopy on atomic and molecular ions	Schmidt-Kaler, Poschinger
2x10	11.01.22	David Latorre Antonio Torregrosa	Gravity and rotation sensing with ultra-cold quantum matter	**2** Windpassinger
2x11	18.01.22	Hannah Jost Can Leichtweiß	Explorations at the end of the nuclear chart	**2** Block, Laatiaoui
12	25.01.22	Janik Sobieray	Gravitational behavior of antimatter	Schmidt-Kaler, Wolf
13	01.02.22	Klaus Hilker	Proton radius puzzle	Pohl