

Electrical quantum metrology in the new SI

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Since May 2019 the fundament of measurement, the SI, is based on fixed values of selected fundamental constants. This brought electrical metrology, which since 1990 stood apart from the SI, back into the common system of units. The practical realization of a quantized voltage by the Josephson effect and of a quantized resistance by the quantum Hall effect does not change, but the result is now directly connected to combinations of the fixed values of the elementary charge e and the Planck constant h . Using Ohm's law this also allows to realize a quantized current. But the new SI also allows for a direct and intuitive realization of the current: generating a quantized current by repetitive transfer of a single quantized charge e . Recent years saw great progress towards such a realization by accurate single electron pumping. Comparing the currents produced by these different realizations, i.e. closing the so called quantum metrology triangle, will allow to test the fundament of electrical quantum metrology. In my presentation I will give an introduction to electrical quantum metrology and the new SI, review the progress on single electron pumping and discuss the status of the quantum metrology triangle.