Our New International System of Units

On World Metrology Day 2019 (20.5.2019) all countries in the world will change the definitions for the following base units of the International System of Units (SI system): the kilogram, the ampere, the kelvin and the mole. In an historic vote on 16.11.2018, the General Conference on Weights and Measures, which represents 98% of the world gross product, decided this change unanimously. This decision means that all SI units will be defined in terms of constants of nature.

The quantized Hall resistance (Nobel Prize 1985) played a crucial role for the realization of this new SI system since this quantum resistance can be used not only for high precision measurements of electrical standards but also for a new realization of a kilogram by comparing electrical and mechanical forces with the Kibble balance.

The talk summarizes the application of the quantum Hall effect in metrology with the focus on the replacement of the kilogram by a fixed value for the Planck constant.