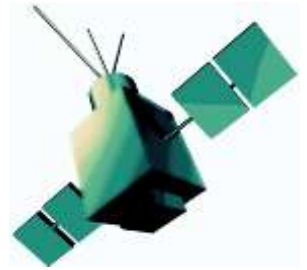


Physikalisches Kolloquium

SoSe 2018



Donnerstag, 12. April 2018, 16 Uhr c.t.

Gebäude NW 1, Otto-Hahn-Allee,
ausnahmsweise im größeren Hörsaal H2!

Referent: Prof. Dr. Joachim Ullrich

Präsident der Physikalisch-Technischen Bundesanstalt (PTB) Braunschweig

Thema: Physical Units based on Fundamental Constants – Changing with Time?

In 2018, on the occasion of the 25th meeting of the General Conference on Weights and Measures, CGPM, of the Metre Convention founded in 1875, it is envisaged to redefine the International System of Units (SI). In the future, as outlined by Max-Planck in his famous paper of 1900 postulating the “Planck constant”, it shall be based on fundamental constants of nature, the “defining constants”: the velocity of light, the charge of the electron, the Boltzmann, Avogadro and the Planck constants, the Cs hyperfine clock transition and the luminous efficacy.

In the talk I will provide an overview on the progress, challenges and future perspectives of the new “Quantum SI”, illustrated in Fig. 1, and discuss the question on whether or not the fundamental constants are indeed constant in time. New experiments are presently being devised, one of them based on next-generation optical clocks using transitions in highly charged ions that are read out via quantum-logic schemes. They bear the chance to trace potential changes in the fine structure constant α on the level of $\Delta\alpha/\alpha \approx 10^{-20}$ per year.

