



TECHNISCHE UNIVERSITÄT  
IN DER KULTURHAUPTSTADT EUROPAS  
CHEMNITZ

# Institut für Physik Physikalisches Kolloquium



**Donnerstag, 30.05.2024, 15:30 Uhr**

**Ort: Reichenhainer Str. 90;**

**Zentrales Hörsaal- und Seminargebäude, Raum C10.013**

**PD Dr. Hans Werner Schumacher**

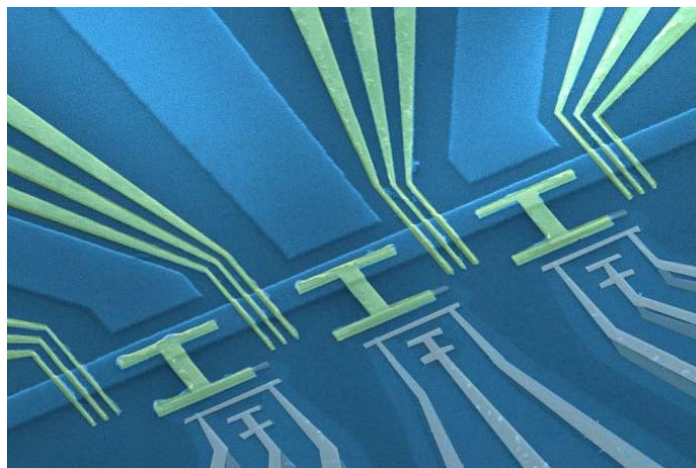
**Physikalisch-Technische Bundesanstalt (PTB)**

**Braunschweig**

## Single Electron Pumps for the Revised Ampere

On May 20th, 2019 the revised International System of Units (the SI) entered into force. Since then, the SI base units are defined by fixed values of a set of fundamental constants, among them the Planck constant  $h$  and the elementary charge  $e$ . A direct primary standard for the electrical base unit ampere could now be realized by so-called single electron pumps. They are based on single electron transistors that are driven by an oscillating gate voltage with frequency  $f$ . During one oscillation cycle one electron is first captured from source and later ejected to drain thereby generating a quantized current  $I = ef$ .

In my talk I will review the present state of single electron pumps for the direct representation of the ampere. I will show that semiconductor-based single electron pumps are excellent candidates for primary current standards allowing high enough currents in combination with excellent quantization accuracy. I will further discuss in-situ measurements of pump errors by single charge detection and I will give a short outlook on further prospects of single electron pumps like the generation of shot noise free currents or the field of single electron quantum optics.



Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:  
Prof. Dr. Christoph Tegenkamp, Tel. 0371 531 33103

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