

## RP SEMINAR

**PRESENTATION 27<sup>th</sup> May 2019, 10h30-11h45, 24/1-024**

**Title:** Silicon Technologies for Emerging Terahertz Applications

**Speaker:** Ullrich Pfeiffer, University of Wuppertal, Germany

**Abstract:**

The push towards terahertz frequencies presents both challenges and opportunities for emerging applications and circuits. This talk presents recent attempts to operate silicon technologies close to and beyond their transistor cut-off frequencies. Silicon BiCMOS process technologies have recently reached  $f_{max}$  as high as 0.7 THz, which enables circuits to operate fundamentally up to about 300 GHz with reasonable RF circuit performance.

Beyond  $f_{max}$ , where transistors do not provide power gain, circuits may be operated sub-harmonically to extend further the operation region. Despite their increased receiver NF, such circuits prove to be useful for emerging applications. At terahertz frequencies, on-chip antennas may be implemented with reasonably high efficiencies and very small area, thus eliminating the need for additional external components such as expensive waveguides or horn antennas. Examples include 100Gbps wireless communication, THz spectroscopy, and THz imaging applications.