Physikalisches Kolloquium

Fachgruppe Physik/Astronomie der Universität Bonn

Freitag, 30. November 2018, 15 Uhr c.t. im Hörsaal I des Physikalischen Instituts

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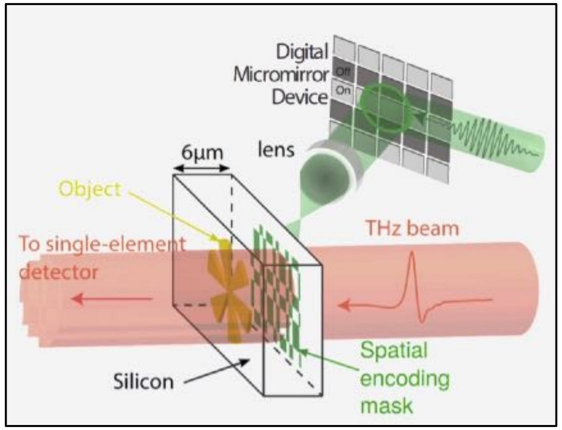
„Computational Near Field THz Imaging“



Most non-conductive materials and non-polar liquids are transparent to terahertz frequencies (0.2-2THz), and due to their non-ionizing photon energies there is great interest and potential in imaging in the THz regime. However, the long wavelengths (1.5-0.15mm) mean that even diffraction limited imaging will fail to resolve structures of micron size many of which have interesting THz interactions. Currently the two most popular approaches for near field THz imaging lie in either scattering tip or scanning aperture methods. Both these approaches rely on a point-by-point measurement in the near field, and are therefore inherently slow.

In this contribution we describe a new technique which uses an optically modulated, spatially patterned THz beam, created via a photomodulator. Using digital micromirror arrays we generate a patterned optical beam with spatial dimensions defined by the optical diffraction limit, which can be quickly reconfigured at rates up to 20 KHz. Using such an optically patterned beam, we can leverage the power of computational imaging techniques such as Hadmard imaging, with excellent signal to noise and high resolution (down to 8µm, ~λ/50), breaking the THz diffraction limit by almost two orders of magnitude. We apply this new technique to measure a number of interesting systems including buried circuits, biological samples and graphene photoconductivity variations.

Nach dem Kolloquium gibt es im Seminarraum 1 (2. Stock, Zi. 2.005) die Gelegenheit, bei Kaffee und Kuchen mit dem Vortragenden zu diskutieren.