UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

SFB TRR 142

technische universität
dortmund

Seminar

Three-dimensional metasurface holography

Lingling Huang
-TRR 142 Guest Scientist-
Tsinghua University, State Key Laboratory of Precision Measurement Technology and Instruments, Beijing, China

Date: **Wednesday, 03.12.2014**
Time: **16:15 – 17:15**
Location: **Lecture Hall A1, Paderborn**

This seminar was jointly organized by the SFB TRR142 and the GRK1464

Contact:
Prof. Dr. Thomas Zentgraf
thomas.zentgraf@upb.de

UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

SFB TRR 142

technische universität
dortmund

Abstract

Three-dimensional metasurface holography

Lingling Huang
Tsinghua University, State Key Laboratory of Precision Measurement Technology and Instruments, Beijing, China

The emerging field of metasurfaces has offered unprecedented functionalities for shaping wave fronts and optical responses. Here, we realize three-dimensional (3D) holography by using metasurfaces with seemingly randomly oriented metallic nanorods. As the phase can be continuously controlled in local subwavelength unit cell by the monolayer rod orientation, metasurfaces represent a great advantage over other conventional methods such as CGH with spatial light modulators (SLM) or diffraction optical elements. High-resolution on-axis 3D holograms with a wide field of view (FOV) and elimination of undesired multiple diffraction orders are achieved. The dispersionless nature of such metasurfaces can result in broadband operation without sacrificing image quality. Such a scheme could potentially be used in any holography-based technique, such as beam shaping, data storage, digital holographic microscopy, optical trapping and micromanipulation in tweezers.