Seminar/Talk

Mixing microwave and light: up-conversion and frequency combs

Harald Schwefel
University of Otago, NZ

Host: Johannes Fink

Dielectric whispering-gallery-mode resonators are a great tool to entrap electro-magnetic radiation throughout the dielectrics transparency range1. I will discuss hybrid systems which are resonant for both microwave and optical fields and that allow for second order nonlinear effects. In an efficient resonant system and for strong microwave and optical fields, sum- and difference frequency generation can cascade, leading to optical frequency combs2. For the limit of very weak microwaves and only sum frequency generation, coherent conversion of microwave signals allows the quantum state of individual microwave photons to be transferred into the optical domain3, useful for connecting future superconducting-qubits-based quantum-networks. In my talk I will discuss our current results and address future direction including dual comb spectroscopy and quantum state conversion.1. Nonlinear and Quantum Optics with Whispering Gallery Resonators, D.V. Strekalov, C. Marquardt, A.B. Matsko, H.G.L. Schwefel, and G. Leuchs, Journal of Optics 18, 123002 (2016).2. Resonant Electro-Optic Frequency Comb, A. Rueda, F. Sedlmeir, M. Kumari, G. Leuchs, and H.G.L. Schwefel, Nature 568, 378 (2019).3. Efficient Microwave to Optical Photon Conversion: An Electro-Optical Realization, A. Rueda, F. Sedlmeir, M.C. Collodo, U. Vogl, B. Stiller, G. Schunk, D.V. Strekalov, C. Marquardt, J.M. Fink, O. Painter, G. Leuchs, and H.G.L. Schwefel, Optica 3, 597 (2016).

Tuesday, August 6, 2019 11:00am - 12:00pm
Heinzel Seminar Room / Office Bldg West (I21.EG.101)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.