

# **Metamaterials: Designing Wave Propagation with a Focus on Electrodynamics**

**760. WE-Heraeus-Seminar**

**07 Feb - 11 Feb 2022**

**Hybrid  
at the Physikzentrum Bad Honnef/Germany**

**WILHELM UND ELSE  
HERAEUS-STIFTUNG**



# Program

## Sunday, 6 February 2022

17:00 – 20:00 Registration

from 18:00 BUFFET SUPPER / Informal get together

## Monday, 7 February 2022

08:00 – 08:45 *BREAKFAST*

08:45 – 09:00 Scientific organizers

**Welcome and opening**

09:00 – 10:00 John Pendry  
(online)

**Luminal gratings enable: photon localisation, Bloch symmetry breaking, and a novel amplification mechanism**

10:00 – 11:00 Ralf Schuetzhold

**Optical Analogues for Fundamental Physics**

11:00 – 11:30 *COFFEE BREAK*

11:30 – 12:30 Silke Weinfurtnner  
(online)

**Quantum simulators for fundamental physics**

12:30 *LUNCH*

14:30 – 15:30 Michèle Heurs  
(online)

**Potential and prospects for meta-mirrors in precision metrology**

15:30 – 16:30 Stefanie Kroker  
(online)

**Metamaterials for Measurements at Ultimate Precision**

16:30 – 17:00 *COFFEE BREAK*

17:00 – 18:00 Martin Wegener

**3D Metamaterials: Chirality and Non-Localilty**

18:00 – 18:15 Stefan Jorda

**About the Wilhelm and Else Heraeus Foundation**

18:15 – 19:00 **Open Discussion**

19:00 *HERAEUS DINNER* at the Physikzentrum  
(cold & warm buffet, with complimentary drinks)

# Program

**Tuesday, 8 February 2022**

08:00 – 09:00	<i>BREAKFAST</i>	
09:00 – 10:00	Andrew Webb (online)	<b>Novel materials in magnetic resonance imaging: high permittivity ceramics, metamaterials, metasurfaces and artificial dielectrics</b>
10:00 – 11:00	Rita Schmidt (online)	<b>Tailoring the RF field at ultra-high field MRI with artificial materials</b>
11:00 – 11:30	<i>COFFEE BREAK</i>	
11:30 – 12:30	Alena Shchelokova (online)	<b>Metamaterial inspired wireless coils and pads for clinical MRI</b>
12:30	<i>LUNCH</i>	
14:30 – 15:30	Yuri Obukhov (online)	<b>General structure of electromagnetism: covariant formulation</b>
15:30 – 16:30	Jonathan Gratus (online)	<b>Corrugated Structures and Mathieu's equation for EM generation and particle acceleration</b>
16:30 – 17:00	<i>COFFEE BREAK</i>	
17:00 – 18:00	<b>Poster Flash</b>	
18:00 – 19:00	<b>Poster Session</b>	
19:30	<i>DINNER</i>	

# Program

Wednesday, 9 February 2022

08:00 – 09:00	<i>BREAKFAST</i>	
09:00 – 10:00	Robin Tucker (online)	<b>Applications of an analysis of classical Plasmon-Polariton-Brewster Modes in Homogeneous Media with an anisotropic planar interfacial surface admittance tensor.</b>
10:00 – 11:00	Christian Pfeifer	<b>General Linear Electrodynamics: Causal Structure, Propagators, Quantization and quantum energy inequalities</b>
11:00 – 11:30	<i>COFFEE BREAK</i>	
11:30 – 12:30	Christian Bär (online)	<b>Wave equations on curved backgrounds</b>
12:30	<i>LUNCH</i>	
14:30 – 15:30	Philippe Roux (online)	<b>Locally resonant metamaterials : from wave physics to geophysics</b>
15:30 – 16:30	Irina Khromova	<b>NFC wireless charging for multiple devices</b>
16:30 – 17:00	<i>COFFEE BREAK</i>	
17:00	<b>Open discussion</b>	
18:30	<i>DINNER</i>	
20:00	Evening lecture Philipp Klais	<b>A world-famous organ builder from Bonn will talk (in German) about an attempt to make physics analogue approachable, tangible and audible in an increasingly digital world</b>

# Program

Thursday, 10 February 2022

08:00 – 09:00	<i>BREAKFAST</i>	
09:00 – 10:00	Walter Fuscaldo	<b>Microwave Generation of Localized Waves Through Leaky-Wave Antennas Based on Metasurfaces</b>
10:00 – 11:00	Vahid Sandoghdar (online)	<b>Quantum Metamaterials with Magnetic Response at Optical Frequencies</b>
11:00 – 11:30	<i>COFFEE BREAK</i>	
11:30 – 12:30	Igor Tsukerman	<b>Homogenization of Metamaterials: Symmetry Breaking and “Bulk Transition”</b>
12:30	<i>LUNCH</i>	
14:30	<b>Excursion</b>	
18:45	<i>DINNER</i>	

# Program

**Friday, 11 February 2022**

08:00 – 09:00	<i>BREAKFAST</i>	
09:00 – 10:00	Yakov Itin	<b>Finsler's metric as a novel tool for wave propagation analysis</b>
10:00 – 11:00	Agostino Monorchio (online)	<b>Multifunctional metasurfaces with absorbing, reflecting and high impedance properties for ICT and Biomedical applications</b>
11:00 – 11:30	<i>COFFEE BREAK</i>	
11:30 – 12:30	Rebecca Seviour (online)	<b>Metamaterial Mediated EM Wave Generation and Amplification</b>
12:30	<i>LUNCH</i>	
14:30 – 15:30	Thomas Bertuch (online)	<b>A Review of RF Metamaterial Applications at Fraunhofer FHR</b>
15:30 – 15:45	Scientific organizers	<b>Conclusion / Poster Award</b>

**End of seminar and departure**