Berlin 2018 – scientific program

DS: Fachverband Dünne Schichten

DS 27: New Twists for Nanoquakes on a Chip - Emerging Applications of Surface Acoustic Waves in Condensed Matter Physics (Focussed Session): Session I

Thursday, March 15, 2018, 09:30–13:15, H 2032

Surface acoustic waves (SAWs) with gigahertz frequencies and micrometre size wavelength can be elegantly generated using piezoelectric transducers fabricated with standard integrated circuit technology. Their small propagation velocity, tight surface confinement, as well as low susceptibility to decoherence and dissipation have been exploited over the past decades in numerous devices, in particular for electronic and optical signal processing. Today, the interaction of SAWs with electrical, optical, magnetic, and mechanical excitations in condensed matter is a highly active field of research. It is driven by the vision to harness the power of this technique in a broad spectrum of emerging applications including advanced sensors, the control of magnetization and collective excitations, as well as the coherent interactions between charge and spin excitations, photons, and phonons down to the fundamental level of single quanta. We propose a symposium that brings together experts for emerging and future applications of surface acoustic waves. For the proposed symposium we have identified potential speakers covering the large palette of fields which this versatile technique is successfully applied or currently evolving towards. These encompass nanoscale acousto-optic integrated circuits and plasmonics, the control of single quantum systems and collective excitations in hybrid systems. Because the proposed symposium covers a wide range of frontier research in which SAWs are employed with greatest success, it will serve as an ideal platform for scientific exchange. Thus, it aims to foster new interactions between the different scientific communities. Its most important goal is to introduce this exciting field of research to the many young Masters and PhD students, and postdocs attending the joint DPG-EPS Spring meeting and gives them the opportunity to present contributed talks at the symposium or associated sessions.

Organized by

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Chris Ford, University of Cambridge, UK, cjbf@cam.ac.uk

Selection status for this session: not selected

⊕	09:30	DS 27.1	Invited Talk: Coupling RF-driven acoustic wave devices with nanocavity optomechanics — •Kartik Srinivasan, Marcelo Wu, Marcelo Davanco, and Krishna Balram
⊕	10:00	DS 27.2	Invited Talk: Quantum Spin-Mechanics with Color Centers in Diamond — •Hailin Wang
⊕	10:30	DS 27.3	Invited Talk: Acoustic Traps and Lattices for Electrons in Semiconductors — Martin Schuetz, •Johannes Knörzer, Géza Giedke, Lieven Vandersypen, Mikhail Lukin, and Ignacio Cirac
⊕	11:00	DS 27.4	Invited Talk: Manipulating single electrons on the fly using a sound wave — •Christopher Bauerle
	11:30		15 min. break.
⊕	11:45	DS 27.5	Surface acoustic wave modulation of a coherently driven quantum dot in a pillar microcavity — •Bruno Villa, Anthony J. Bennett, David J. P. Ellis, James P. Lee, Joanna Skiba-Szymanska, Thomas A. Mitchell, Jonathan Griffiths, Ian Farrer, David A. Ritchie, Christopher J. B. Ford, and Andrew J. Shields
⊕	12:00	DS 27.6	Surface acoustic wave regulated single photon emission of a coupled quantum dot-nanocavity system — •Matthias Weiss, Stephan Kapfinger, Thorsten Reichert, Jonathan Finley, Achim Wixforth, Michael Kaniber, and Hubert Krenner
⊕	12:15	DS 27.7	Development of a SAW-driven source of single photons — •A. Rubino, T-K Hsiao, Y. Chung, S-K Son, H. Hou, A. Nasir, J Pedros, R. T. Phillips, G. Éthier-Majcher, M. Stanley, M. Atatüre, K. Niang, G. Rughoobur, A. Flewitt, T. Mitchell, J. P. Griffiths, I. Farrer, D. A. Ritchie, and C. J. B. Ford
⊕	12:30	DS 27.8	SAW Transducers with Gouy Phase Adjustments for Minimal Beam Waist — •Madeleine Msall and Paulo Santos
⊕	12:45	DS 27.9	Multi-harmonic quantum dot optomechanics in fused $LiNbO_3$-(Al)GaAs hybrids — •Emeline Nysten, Yong Heng Huo, Hailong Yu, Guo Feng Song, Armando Rastelli, and Hubert J. Krenner
⊕	13:00	DS 27.10	Zero-group-velocity acoustic waveguides for high-frequency resonators — •Muhammad Hamidullah and Cinzia Caliendo

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DS 33: New Twists for Nanoquakes on a Chip - Emerging Applications of Surface Acoustic Waves in Condensed Matter Physics (Focussed Session): Session II

Thursday, March 15, 2018, 15:00–15:45, H 2032

Surface acoustic waves (SAWs) with gigahertz frequencies and micrometre size wavelength can be elegantly generated using piezoelectric transducers fabricated with standard integrated circuit technology. Their small propagation velocity, tight surface confinement, as well as low susceptibility to decoherence and dissipation have been exploited over the past decades in numerous devices, in particular for electronic and optical signal processing. Today, the interaction of SAWs with electrical, optical, magnetic, and mechanical excitations in condensed matter is a highly active field of research. It is driven by the vision to harness the power of this technique in a broad spectrum of emerging applications including advanced sensors, the control of magnetization and collective excitations, as well as the coherent interactions between charge and spin excitations, photons, and phonons down to the fundamental level of single quanta. We propose a symposium that brings together experts for emerging and future applications of surface acoustic waves. For the proposed symposium we have identified potential speakers covering the large palette of fields which this versatile technique is successfully applied or currently evolving towards. These encompass nanoscale acousto-optic integrated circuits and plasmonics, the control of single quantum systems and collective excitations in hybrid systems. Because the proposed symposium covers a wide range of frontier research in which SAWs are employed with greatest success, it will serve as an ideal platform for scientific exchange. Thus, it aims to foster new interactions between the different scientific communities. Its most important goal is to introduce this exciting field of research to the many young Masters and PhD students, and postdocs attending the joint DPG-EPS Spring meeting and gives them the opportunity to present contributed talks at the symposium or associated sessions.

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Chris Ford, University of Cambridge, UK, cjbf@cam.ac.uk

Selection status for this session: not selected

⊕	15:00	DS 33.1	Acousto-electric transport in epitaxial graphene coated by a ZnO piezoelectric film — •Yi-ting Liou, Alberto Hernández-mínguez, Jens Herfort, João marcelo Lopes, Abbes Tahraoui, and Paulo Santos
⊕	15:15	DS 33.2	Acoustically-driven surface phonon-plasmon polaritons in graphene/h-BN and graphene/h-BN/graphene heterostructures on piezoelectric substrates — •Rajveer Fandan, Jorge Pedrós, Jürgen Schiefele, Alberto Boscá, Javier Martínez, and Fernando Calle
⊕	15:30	DS 33.3	Sub-decay time control of the optical emission of lead halide perovskite nanowires at room temperature — •Lisa Janker, Lakshminarayana Polavarapu, Yu Tong, Alexander S. Urban, Jochen Feldmann, and Hubert J. Krenner