Aktuelle Veranstaltungen

Kolloquium

Thema: **Functional Nanocomposites – From Fabrication to Function**

Datum: 01.07.19

Uhrzeit: 16:15

Ort: H 5

Vortragender: Prof. Dr. Franz Faupel

Chair for Multicomponent Materials, Faculty of Engineering, Kiel University

Inhalt: Highly filled particulate nanocomposite films consisting of metal nanoparticles in a dielectric organic or ceramic matrix have unique functional properties with hosts of applications. In most applications, a high filling factor close to the percolation threshold with control of the particle separation on the nm scale is essential because the functional properties often require short-range interaction between nanoparticles. The present talk demonstrates how vapor phase deposition techniques can be employed for tailoring the nanostructure and the resulting properties. Vapor phase deposition, inter alia, allows excellent control of the metallic filling factor and its depth profile as well as the incorporation of alloy nanoparticles with well-defined composition. We applied various methods such as sputtering, evaporation, and plasma polymerization for the deposition of the matrix, and the metallic component was mostly sputter-deposited or evaporated. Recently, we put emphasis on generation of the nanoparticles by means of high-rate gas aggregation cluster sources to obtain independent control of filling factor and size of the embedded nanoparticles. Formation of plasmonic nanoparticles can be monitored in situ via UV-vis spectroscopy. We also demonstrate in situ control of the composition of alloy nanoparticles and the ability to fabricate multiple core-shell particles [1-3]. Examples of fabricated nanocomposites range from plasmonic meta-materials with tuned particle surface plasmon resonances through photoswitshable devices to memristors [4,5]. Moreover, we will show a new process for photocatalytic growth of Au nanostructures [6]. In addition to the particulate composites, a new concept of layered magnetoelectric composites will be presented for robust, fully integrable, broadband magnetic field sensors based on the delta E effect [7]. Moreover, we will discuss a novel energy efficient magnetic field sensor [8]. References [1] O. Polonskyi, T. Peter, V. Zaporojtchenko, H. Biedermann, F, Faupel, Appl. Phys. Lett. 103 (2013) 033118. [2] A. Vahl, J. Strobel, W. Reichstein, O. Polonskyi, T. Strunskus, L. Kienle,

F. Faupel, Nanotechnology 28 (2017) 175703. [3] P. Sola?, O. Pol nskyi, A. Olbricht, A. Hinz, A. Shelemin, O. Kylián, A. Choukourov, F. Faupel, H. Biederman, Sci. Rep. 7 (2017) 8514. [4] M. Keshavarz Hedayati, M. Javaherirahim, B. Mozooni, R. Abdelaziz, A. Tavassolizadeh, V.S.K. Chakravadhanula, V. Zaporojtchenko, T. Strunskus, F. Faupel, M. Elbahri, Adv. Mater. 23 (2011) 5410. [5] S.W. Basuki, V. Schneider, T. Strunkus, M. Elbahri, F. Faupel, ACS Appl. Mater. Interfaces 7 (2015) 11257. [6] S. Veziroglu, M.Z. Ghori, M. Kamp, L. Kienle, H.-G. Rubahn, T. Strunskus, J. Fiutowski, J. Adam, F. Faupel, C. Aktas, Adv. Mater. Interfaces (2018) 1800465. [7] B. Gojdka, R. Jahns, K. Meurisch, H. Greve, R. Adelung, E. Quandt, R. Knöchel, F. Faupel, Appl. Phys. Lett. 99 (2011) 223502; Nature 480 (2011) 155. [8] M. Mintken, M. Schweichel, S. Schröder, S. Kaps, J. Carstensen, Y. K. Mishra, T. Strunskus, F. Faupel, R. Adelung, Nano Energy 56 (2019) 420

Ansprechpartner: A. Hütten

Kolloquium Mathematische Physik

Thema: **tba**

Datum: 05.07.19

Uhrzeit: 16:15

Ort: V3-204

Vortragender: Dirk Hundertmark

KIT

Inhalt:

Ansprechpartner: M. Baake

Seminar Hochenergiephysik

Thema: **tba**

Datum: 09.07.19

Uhrzeit: 14:15

Ort: D6-135

Vortragender: Karl Jansen

DESY Zeuthen

Inhalt:

Ansprechpartner: W. Unger

Seminar Kondensierte Materie

Thema: **tba**

Datum: 04.07.19

Uhrzeit: 14:15

Ort: D5-153

Vortragender: Rebecca Werdehausen

Bielefeld University

Inhalt:

Ansprechpartner: Gernot Akemann

Seminar Mathematische Physik

Thema: **Critical behaviour and characteristic polynomials of non-Hermitian random matrices**

Datum: 23.05.19

Uhrzeit: 16:15

Ort: D5-153

Vortragender: Nicholas Simm

University of Sussex

Inhalt: I will discuss some recent developments regarding the normal matrix model. In particular my interest will be in certain critical models where the limiting support of the eigenvalues can radically change its topology by slightly adjusting an external parameter. I will discuss how aspects of the model can be explicitly mapped to the study of expectations of characteristic polynomials of non-Hermitian random matrices (e.g. Ginibre or truncated unitary). Many of these averages are related to Painlevé transcendents, and by exploiting this, a precise and non-trivial asymptotic expansion of partition functions can be calculated in the critical models. This is joint work with Alfredo Deaño (University of Kent).

Ansprechpartner: Gernot Akemann

Seminar AG Zufallsmatrizen

Thema: **Non-Hermitian matrices: critical behaviour and asymptotics**

Datum: 19.06.19

Uhrzeit: 16:15

Ort: V3-201

Vortragender: Alfredo Deano

University of Kent

Inhalt: In this talk we present some recent work on the large N asymptotic behavior of the partition function for NxN non-Hermitian random matrices, in particular Ginibre ensemble with added algebraic singularities. This model is motivated by the study of normal random matrix ensembles with rotational symmetry in the complex plane. In suitable double scaling regimes, when these singularities are allowed to merge or collide with the boundary of the limit support of the equilibrium measure, we also investigate the appearance of Painlevé transcendents, in analogy with the case of Hermitian ensembles. This is joint work with Nick Simm (University of Sussex)

Ansprechpartner: Gernot Akemann