TMDCs this is strongly limited due to ultrafast optical exciton recombination and electron-hole exchange interaction. By contrast, in TMDC heterostructures, ultrafast interlayer charge transfer may circumvent these limits on valley polarization lifetimes.
We use two-color time-resolved Kerr rotation measurements to study the spin-valley dynamics in disulfide-based TMDCs and their heterostructures. The independent tunability of our coupled laser systems allows to selectively pump and probe their excitonic transitions resonantly. We present low-temperature valley dynamics studies on TMDC monolayers and twisted MoS2-WS2 heterostructures fabricated by combining CVD-grown and exfoliated monolayers.

DS 4.2 Tue 10:00 P

Revealing in plane g factors in multilayer WSe2 via time-resolved Faraday experiments — •Simon Raiber, Dennis Falter, and Christian Schüller — Universtiät Regensburg
With the increasing investigation of two-dimensional heterostructures, the question arises how far the layer-intrinsic properties are imparted to multilayer van der Waals structures. While the effects of external magnetic fields on transition metal dicalcogenides monolayers have been studied intensively during the last years, the interaction of multiple layers remained largely disregarded.

We demonstrate a non-zero effective g factor for in plane magnetic fields in few-layer WSe2 making use of time-resolved Faraday rotation experiments. The found values commensurate to the established out of plane effective g factors. This indicates an isotropic effective in plane g factor for multilayer WSe2, which stands in contrast to monolayer samples. Up to now no standard theoretical approach can model an non-zero in plane g factor.

DS 4.3 Tue 10:00 P

Controlled moirè potentials of MoSe2/WSe2 heterostructures for time resolved kerr measurments — •Andreas Beer, Philipp Parzefall, Laura Zinkl, Anna Weindl, and Christian Schüller — Universität Regensburg
In heterostructures the twist angle serves as an degree of freedom to severly manipulate exciton dynamics.

We fabricate heterostructures with advanced twist angle control by staking CVD-grown triangulars of TMDCs.

To track the excitons dynamics on the femtosecond timescale we use two color pump probe measurements.

DS 4.4 Tue 10:00 P

Strong coupling of Bloch Surface Waves and excitons in ZnO up to 430 K — •Sebastian Henn, Marius Grundmann, and Chris Sturm — 1Universität Leipzig, Faculty of Physics and Earth Sciences, Felix-Bloch institute for solid state physics, Linnéstr. 5, 04103 Leipzig, Germany
Exciton-polaritons are bosonic quasi-particles consisting of a cavity photon and an electron-hole pair, exhibiting interesting physical phenomena like Bose-Einstein condensation [1]. Of special interest are exciton-polaritons in semiconductors with large exciton binding energies, where the strong coupling is observable above room temperature [2]. We report here on the experimental observation of the strong coupling between ZnO excitons and Bloch Surface Waves (BSW) up to 430 K. The sample consists of a Bragg reflector and a thin ZnO top layer. This system holds several advantages compared to exciton-polaritons in conventional microcavities: high propagation lengths due to the low loss BSW with large in-plane wave vector, a reduced complexity of production and direct access to the mode-supporting surface layer. In combination with a stable operation at high temperatures, this is of interest for the development of integrated optics devices. By means of a prism coupler in reflection geometry the polariton dispersion was observed and analyzed. We determined the temperature dependent coupling strength, exciton energy and dielectric background.

[1] J. Klaers *et al.*, Nature **468**, 545-548 (2010)
[2] C. Sturm *et al.*, New J. Phys. **11**, 073044 (2009)

DS 4.5 Tue 10:00 P

Novel 2D surface alloys on Pt(111): electronic and structural properties — •Marta Przychodnia[1], Tomasz Grzela[1], Roland Wiesendanger[2], and Maciej Bazarnik[1,2] — [1]Institute of Physics, Poznan University of Technology, Poznan, Poland — [2]Department of Physics, Hamburg University, Hamburg, Germany
Lately, a new class of 2D magnetic films has been discovered, namely rare earth (RE) metals - transition metals (TM) surface alloys. Limiting the dimensionality of RE-TM alloys to 2D (so-called surface alloys) influences their properties in surprising ways. For example, a $GdAu_2$ and $GdAg_2$ surface alloys are ferromagnetic while in bulk they are antiferromagnetic. Small change of Au to Ag in this system raise the Curie temperature from 19°C to 85°C showing potential for tuneability.

Here, I will present the comparison study of Dy-Pt and Gd-Pt mono- and double-layers of surface alloys grown on Pt(111). Structural and electronic properties in atomic scale of both systems were investigated using scanning tunneling microscopy (STM) and spectroscopy (STS).

DS 4.6 Tue 10:00 P

Measuring Material-Specific Properties with Ultra-High Vacuum Atomic Force Microscopy — •Frederic Luis Condin, Jesús Sánchez Lacasa, and Baran Eren — Department of Chemical and Biological Physics, Weizmann Institute of Science, Rehovot, Israel
The real-space imaging capabilities provided by scanning probe microscopy techniques have undoubtedly revolutionized the scientific study of surfaces and processes happening thereon. Whereas scanning tunneling microscopy is limited to conductive samples, atomic force microscopy can be used for any surface. A general problem of scanning probe microscopy is its lack of element specificity, i.e., it cannot be used for the identification of materials or adsorbed surface species without additional information or prior knowledge about the sample. We address this problem and present contributions towards the chemical identification of surface materials. To this end, we calculate Hamaker constants on different points of a sample from bias voltage and tip-sample distance dependent measurements of the frequency shift in amplitude and frequency modulation atomic force microscopy.

DS 4.7 Tue 10:00 P

Coordinated Development of Tubes and Optics: New possibilities for X-ray Analytics — •Jörg Wiesmann, Moritz Schlie, Jürgen Graf, Frank Hertlein, and Paul Radcliffe — Incoatec GmbH, Max-Planck-Strasse 2, 21502 Geesthacht
At Incoatec, we have a long history of offering solutions driven by the needs of the customers. As a specialist for multilayer optics we penetrated the crystallography market with our complete IμS Microfocus Solutions in 2006. Optics can only evolve their whole strength when the source is also matched to it. Due to this fact, we started in 2011 with the in-house development of X-ray sources. The aim was to offer the best combination of optics and sources for certain applications in small and macromolecular structure analysis. We were able to launch new solutions like the IμS3.0 and the IμS DIAMOND that offers a flux density of more than $5*10^{10}$ ph/s/mm^2 within a spot of less than 100μm. This high flux density is achieved with a low power air-cooled source that doesn't need maintenance during the typical life time of more than 6 years. We will summarize the key parameters for combining multilayer optics and microfocus tubes to achieve collimated or focused X-ray sources with high brilliance. The main part of the talk will explain the application-dependent design of our metal-ceramic tubes and how to match them with our multilayer optics. Applications include crystallography, nanotechnology and thin film research.

DS 4.8 Tue 10:00 P

Persistent response in ultra-strongly driven mechanical membrane resonators — •Fan Yang[1], Felicitas Hellbach[1], Felix Rochau[1], Wolfgang Belzig[1], Eva Weig[1,2], Gianluca Rastelli[3], and Elke Scheer[1] — [1]Fachbereich Physik, Universität Konstanz, 78457 Konstanz, Germany — [2]Fakultät für Elektrotechnik und Informationstechnik, Technische Universität München, 80333 München, Germany — [3]INO-CNR BEC Center and Dipartimento di Fisica, Università di Trento, 38123 Povo, Italy
We study experimentally and theoretically the phenomenon of *persistent response* in ultrastrongly driven membrane resonators. The term persistent response denotes the development of a vibrating state with nearly constant amplitude over an extreme wide frequency range of more than 50% of the eigenfrequency. This phenomenon is unusual and is key to avoid breakdown, since it imposes a self-limitation of the maximum amplitude. We reveal the underlying mechanism by directly imaging the vibrational state using advanced optical interferometry. We argue that this state is related to the nonlinear interaction between higher-order flexural modes and higher-order overtones of the driven mode. Finally, we propose a stability diagram for the different vibrational states that the membrane can adopt.

DS 4.9 Tue 10:00 P

Tunable frequency comb in flexural-mode-coupling regime in nonlinear mechanical membrane resonators — •Mengqi Fu, Fan Yang, and Elke Scheer — Fachbereich Physik, Universität Konstanz, 78457 Konstanz, Germany
Multimode coupling in mechanical systems has attracted broad interest in many realms of physics[1,2]. Recently, the research on the multimode coupling has been extended to strong nonlinear systems and novel phenomena have been observed caused by the strong nonlinearity of the coupled flexural modes[2]. Here, we demonstrate a novel tunable frequency comb generated by driving the mechanical system into the strongly nonlinear regime, i.e. the flexural-mode-coupling regime, by one-tone excitation. The studied system is based on a suspended SiN membrane (~ 500 nm thickness) with a quality factor of ~ 19000. The frequency separation between neighboring sidebands of the frequency comb strongly depends on the damping factor, nonlinearity, vibration amplitude and the detuning frequency of the two coupled flexural modes. The frequency separation is tunable by varying the detuning frequency and the strength of the drive power. By systematically investigating the frequency response of the fluctuations close to the coupled flexural modes, we show that the observed frequency comb is generated when the "very states"[3] produced by the nonlinearity of the coupled flexural modes are crossed experimentally.