

# Spring Conference of SPP 2244

Physikzentrum Bad Honnef, March 15 – 18, 2023

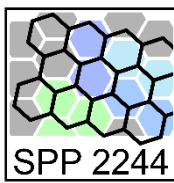
## Event Locations:

- Meeting venue: Physikzentrum Bad Honnef (Hauptstraße 5, 53604 Bad Honnef)
- The closest train station to the meeting venue is “Bad Honnef (Rhein)”.
- Hotel rooms at Physikzentrum provided and paid for by the central project
- Daily visitors have to organize and pay for their own accommodation, but can participate in all parts of the scientific program, including the meals

## Comments:

- The detailed scientific schedule can be found on the next pages, an overview over all posters is given as well. A book of abstracts is in preparation.
- The time slots for your talks are 10 minutes for single PI projects and 15 minutes for consortia. Each presentation is followed by a 5-minute discussion.
- If only one PI of a given project is present then their name is underlined as speaker. If you want to fix who will present your project, please contact the SPP Office.
- The posters presented during the poster sessions can be found in the book of abstracts (see meeting website). Poster sessions A and C are meant for PIs, PostDocs and external participants, poster session B is meant for PhD students to present their work.

Times		Wednesday	Thursday	Friday	Saturday	Times		
08:00	00 15 30 45		Breakfast	Breakfast	Breakfast	00 15 30 45	08:00	
09:00	00 15 30 45		Opening	Opening	Session 6	00 15 30 45	09:00	
10:00	00 15 30 45		Session 1	Session 3		Coffee Break	00 15 30 45	10:00
11:00	00 15 30 45		Coffee Break	Coffee Break	Session 7	00 15 30 45	11:00	
12:00	00 15 30 45		Posters A PIs	Posters C PIs	Closing	00 15 30 45	12:00	
13:00	00 15 30 45		Lunch + 14:00 Meeting Steering Cmte.	Lunch	Departure	00 15 30 45	13:00	
14:00	00 15 30 45		Session 2	Session 4		00 15 30 45	14:00	
15:00	00 15 30 45		Coffee Break	Coffee Break		00 15 30 45	15:00	
16:00	00 15 30 45		Arrival + Registration	Posters B PhDs		Session 5	00 15 30 45	16:00
17:00	00 15 30 45			Dinner		Dinner	Dinner	00 15 30 45
18:00	00 15 30 45					00 15 30 45	18:00	
19:00	00 15 30 45					00 15 30 45	19:00	

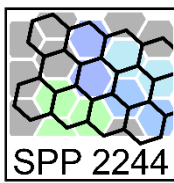


## Wednesday, March 15

From 16:30	Registration
18:30	Dinner

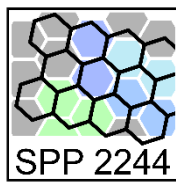
## Thursday, March 16

9:00 - 9:30	<b>Opening (Thomas Heine)</b> Information from the central project of the SPP 2244	
9:30 - 10:45	<b>Session 1 (Chair: Oisín Garrity)</b>	
	9:30 - 9:45	<u>Patryk Kusch</u> Stephanie Reich Chasing polaritons: A pathway to investigate the optoelectronic properties of van der Waals heterostructures
	9:50 - 10:05	Hannah Nerl Katja Höflich Tuning and mapping hybrid polaritons at the nanoscale
	10:10 - 10:20	Arash Rahimi-Iman Optical properties of 2D material heterostructures
	10:25 - 10:35	Niels Schröter Spectromicroscopy of 2D interfaces
10:45 - 11:30	<b>Coffee break</b>	
11:30 - 13:00	<b>Poster session A</b> (PIs, PostDocs + external participants)	
13:00 - 14:30	<b>Lunch</b>	
14:00 - 14:30	<b>Meeting of the Steering Committee</b>	
14:30 - 15:45	<b>Session 2 (Chair: Nihad Abuawwad)</b>	
	14:30 - 14:40	Jurgen Smet Magnetotransport studies of interfacial interactions in van der Waals structures
	14:45 - 15:00	<u>Christoph Stampfer</u> Benoit Hackens Rebeca Ribeiro-Palau Tunable twistrionics: local tuning and probing of topological edge states and superconductivity in bilayer graphene
	15:05 - 15:15	Felix Lüpke Topological superconductivity and Majorana states in van der Waals heterostructures characterized by scanning probe microscopy
	15:20 - 15:35	Xinliang Feng Thomas Heine Thomas Weitz Topological effects in graphene/2D polymer superlattices
15:45 - 16:30	<b>Coffee break</b>	
16:30 - 18:00	<b>Poster session B</b> (PhD + master students)	
18:30	<b>Dinner</b>	



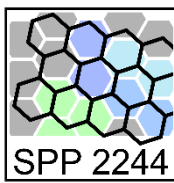
## Friday, March 17

<b>9:00 - 9:15</b>	<b>Opening (Thomas Heine)</b> Information on the 2nd funding period		
<b>9:15 - 10:45</b>	<b>Session 3 (Chair: Edith Wietek)</b>		
	9:15 - 9:25	Stuart Parkin	Artificial multiferroic van der Waals heterostructures
	9:30 - 9:45	Angelo Di Bernardo Hadar Steinberg Wolfgang Belzig Elke Scheer	Towards 2D superconducting spintronics
	9:50 - 10:00	Thomas Brumme	Spin-orbit coupling, spintexture, and Ising superconductivity in TMDC heterostructures
	10:05 - 10:15	Roland Bennewitz	Compressive strain in stacked 2D materials: from proximity to metastable hybridization
	10:20 - 10:35	Jonathan Finley Fei Ding Rolf Haug	Tunable moiré potentials in 2D-heterostructures using anisotropic strain
<b>10:45 - 11:30</b>	<b>Coffee break</b>		
<b>11:30 - 13:00</b>	<b>Poster session C</b> (PIs, PostDocs + external participants)		
<b>13:00 - 14:00</b>	<b>Lunch</b>		
<b>14:00 - 15:45</b>	<b>Session 4 (Chair: Jonas Hauck)</b>		
	14:00 - 14:15	Christopher Gies Christian Schneider Stephan Reitzenstein	Light-matter coupling and cavity-QED with moiré excitons in van der Waals heterostructures
	14:20 - 14:30	Agnieszka Kuc	Modelling (opto)electronic properties of van der Waals materials
	14:35 - 14:50	<u>Tobias Korn</u> Christian Schüller Andrey Turchanin	Interlayer excitons in advanced, CVD-based van der Waals heterostructures with controlled moiré wavelength
	14:55 - 15:10	<u>Sebastian Bange</u> Kai-Qiang Lin	Tuning excitonic quantum optics in stacked van-der-Waals semiconductors
	15:15 - 15:30	<u>Ralph Ernstorfer</u> Samuel Beaulieu	Tailoring electronic correlations, excitonics and topological properties in van der Waals heterostructures on ultrafast timescales
<b>15:45 - 16:30</b>	<b>Coffee break</b>		
<b>16:30 - 18:00</b>	<b>Session 5 (Chair: Shuangjie Zhao)</b>		
	16:30 - 16:45	Alexander Steinhoff Alexey Chernikov Alexander Högele	Quantum gases in semiconductor van der Waals heterostructures
	16:50 - 17:05	Markus Ternes Samir Lounis	Subnanoscale engineering of 2D magnetism in van der Waals heterostructures
	17:10 - 17:25	Rudolf Bratschitsch Michael Rohlfing Steffen Michaelis de Vasconcellos	Optical excitations in transition metal dichalcogenide heterostructures under pressure
	17:30 - 17:40	Gabriel Bester	Atomistic theory of excited states in van der Waals heterostructures: Moiré confinement strain and electric field effect
<b>18:30</b>	<b>Dinner</b>		



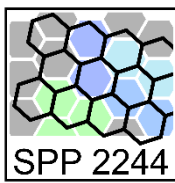
## Saturday, March 18

<b>9:15 - 10:15</b>	<b>Session 6 (Chair: Anirban Chakraborty)</b>		
	9:15 - 9:30	Christoph Kastl Marko Burghard Alexander Holleitner	Electronic control of spin-orbit and magnetic exchange coupling in graphene vdW-heterostructures (SOControl)
	9:35 - 9:45	Jaroslav Fabian	Proximity effects in 2D magnetic vdW (hetero)multilayers
	9:50 - 10:00	<u>Leonid Golub</u> Sergey Ganichev	Terahertz nonlinear transport in twisted graphene and van der Waals heterostructures
<b>10:15 - 10:45</b>	<b>Coffee break</b>		
<b>10:45 - 11:30</b>	<b>Session 7 (Chair: Anirban Chakraborty)</b>		
	10:45 - 11:00	<u>Ursula Wurstbauer</u> Tim Wehling	Correlated miniband and multivalley physics in twisted transition metal dichalcogenides
	11:05 - 11:20	<u>Ammon Fischer</u> Carsten Honerkamp Dante Kennes	Microscopic understanding of correlation effects in twisted van der Waals [hetero]structures
<b>11:30 - 12:00</b>	<b>Closing (Thomas Heine)</b>		
<b>12:00 - 13:00</b>	<b>Lunch</b>		
<b>From 13:00</b>	<b>Departure</b>		



## Poster session A

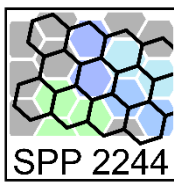
Nr.	Presenter	Title	PI
A1	Bartosz Szczefanowicz	Compressive strain in stacked 2D materials: from proximity to metastable hybridization	Roland Bennewitz
A2	Patryk Kusch	Chasing Polaritons: A Pathway to investigate the optoelectronic properties of van der Waals heterostructures	
A3	Thomas Weitz Thomas Heine Xinliang Feng	Interaction effects in graphene/2D polymer heterostructures	
A4	Jurgen Smet	Non-linear Landau level fan diagram for graphene electrons exposed to a Moiré potential	
A5	Yaroslav Zhumagulov	Spin-orbit coupling-induced correlated phases in rhombohedral trilayer graphene	Jaroslav Fabian
A6	Christian Schneider Stephan Reitzenstein Christopher Gies	Light-matter coupling and cavity-QED with moiré excitons in van der Waals heterostructures	
A8	Gabriel Bester	Atomistic theory of excited states in van der Waals heterostructures: Moiré confinement strain and electric field effect	
A9	Alexander Högele	Excitons in reconstructed moiré heterostructures	
A10	Alexander Steinhoff	Many-body theory for quantum gases in moiré-free heterobilayers	
A11	Hannah Nerl Katja Höflich	Tuning and mapping hybrid polaritons at the nanoscale	
A12	Marko Burghard Christoph Kastl Alexander Holleitner	Electronic control of spin-orbit and magnetic exchange coupling in graphene-based vdW heterostructures	
A13	Stuart Parkin	Artificial multiferroic van der Waals heterostructures	
A14	Sebastian Bange	Tuning excitonic quantum optics in stacked van-der-Waals semiconductors	
A15	Ursula Wurstbauer	Correlated miniband and multivalley physics in twisted transition metal dichalcogenides	
A16	Ralph Ernstorfer	Tailoring electronic correlations, excitonics and topological properties in van der Waals heterostructures on ultrafast timescales	
A17	Jan-Hauke Graalman Steffen Michaelis de Vasconcellos	Optical excitations in transition metal dichalcogenides under pressure	Rudolf Bratschitsch Michael Rohlfing
A18	Emeline Nysten	Straintronics with van der Waals Ferroelectrics	Ursula Wurstbauer
A19	Niels Schroeter	Spectromicroscopy of 2D interfaces	
A20	Leonid Golub	Terahertz nonlinear transport in twisted bilayer graphene and van der Waals heterostructures	Sergey Ganichev
A21	Carsten Honerkamp	Microscopic understanding of correlation effects in twisted van der Waals [hetero]structures	
A22	Christoph Stampfer	Tunable twistronics: local tuning and probing of topological edge states and superconductivity in bilayer graphene	
A23	Artur Erbe Nikol Lambeva	Integration of Air Sensitive 2D Materials	



## Poster session B

Nr.	Presenter	Title	PI
<b>B1</b>	Anirban Chakraborty	Skyrmions and Josephson diode effect in 2D materials	Stuart Parkin
<b>B2</b>	Sourabh Patil	Towards two-dimensional (2D) superconducting spintronics: The "mirage" gap as a signature of triplet superconductivity in an Ising superconductor	Wolfgang Belzig
<b>B3</b>	Jonas B. Hauck	Improvement and applications of FRG for 2D materials	Carsten Honerkamp
<b>B4</b>	Bartosz Szczefanowicz	Compressive strain in stacked 2D materials: from proximity to metastable hybridization	Roland Bennewitz
<b>B5</b>	Nils-Erik Schütte Niclas Götting Carl Emil Mørch Nielsen	Effects of atomic reconstructions on correlated states of moiré interlayer excitons	Christopher Gies Gabriel Bester
<b>B6</b>	Edith Wietek	Non-linear and negative diffusion of optical excitations in moiré-free heterobilayers	Alexey Chernikov
<b>B7</b>	Sayooj Satheesh	Skyrmion formation and multi-spin switching behavior in 2D Van der Waals magnets	Marko Burghard
<b>B8</b>	Ruven Hübner	Theoretical description of moiré excitons in twisted TMD homobilayers	Alexander Steinhoff
<b>B9</b>	Jonas Bauer	Probing excitonic population dynamics by nonlinear optical wave mixing in monolayer WSe <sub>2</sub>	Kaiqiang Lin Sebastian Bange
<b>B10</b>	Julian Picker Antony George	Tailored growth of high quality TMD monolayers and their heterostructures	Andrey Turchanin
<b>B12</b>	Florian Arnold	Electronic signatures of graphene and hBN implemented in twisted bilayer MoS <sub>2</sub>	Thomas Heine
<b>B13</b>	Andreas Beer	Long dark interlayer exciton diffusion length revealed by a CVD-based MoSe <sub>2</sub> /WSe <sub>2</sub> heterostructure	Christian Schüller
<b>B14</b>	Nihad AbuAwwad	Proximity-induced topological magnetism	Samir Lounis
<b>B15</b>	Oisín Garrity	Exciton-Phonon Coupling in MoSe <sub>2</sub> /WSe <sub>2</sub> Heterobilayers Probed Using Resonant Raman Spectroscopy	Patryk Kusch
<b>B16</b>	Alfredo Spuri	Signatures of superconducting proximity effects in two-dimensional (2D) superconductor/ferromagnet (S/F) bilayers with a helimagnetic metal	Angelo Di Bernardo Elke Scheer
<b>B17</b>	Tobias Wichmann	Phonon gap supported tunneling and Faraday screening through graphene	Felix Lüpke
<b>B18</b>	Shuangjie Zhao	Theoretical Investigation of 2D-COF/Graphene Multilayer Structures	Thomas Heine
<b>B19</b>	Carl Emil Mørch Nielsen	Capturing Relaxation Effects and Modelling the Moiré Potentials of Twisted Bilayer TMDs	Gabriel Bester

## Poster session C



Nr.	Presenter	Title	PI
C1	Thomas Brumme	Interplay between stacking and magnetic configurations in MPS <sub>3</sub> bilayers	
C2	Felix Lüpke	Topological superconductivity and Majorana states in van der Waals heterostructures characterized by scanning probe microscopy	
C3	Wolfgang Belzig	Critical temperature of superconductor-ferromagnetic bilayers with helimagnetic metals	
C4	Andrey Turchanin	Tailored growth of high quality TMD monolayers and their heterostructures	
C5	Christian Schüller	Interlayer excitons in advanced, CVD-based van der Waals heterostructures with controlled moiré wavelength	
C6	Markus Ternes	Subnanoscale engineering of 2D magnetism in van der Waals heterostructures	
C7	Jose Martinez Castro	Robust one-dimensional topological superconductivity in a van der Waals heterostructure probed by Abrikosov vortices	Markus Ternes
C8	Hadar Steinberg	Superconductor-Ferromagnet van-der-Waals Stacked Devices	
C9	Elke Scheer Angelo Di Bernardo	Other van der Waals platforms and spectroscopy tools for 2D superconducting spintronics	
C10	Tobias Korn	Interlayer excitons and mode-selective Raman enhancement in hybrid TMDC heterostructures	
C11	Swarup Deb	Spectroscopy in 3R-Transition Metal Dichalcogenides	Tobias Korn
C12	Samir Lounis	Subnanoscale engineering of 2D magnetism in van der Waals heterostructures	
C13	Angelo Di Bernardo	Signatures of superconducting proximity effects in two-dimensional (2D) superconductor/ferromagnet (S/F) bilayers with a helimagnetic metal	
C14	Jonathan Finley	Tunable moiré potentials in 2D-heterostructures using anisotropic strain (TUMPAS-2D)	
C15	Andreas Stier	Proximity-enhanced valley Zeeman splitting at the WS <sub>2</sub> /graphene interface	Jonathan Finley
C16	Rolf Haug	Transport Properties of 2d Heterostructures	
C17	Fei Ding	Strain is Simple, but Powerful: Case studies of strain engineering in emerging materials	
C18	Arash Rahimi-Iman	Angle-resolved optical spectroscopy of monolayer and heterostructure transition-metal dichalcogenides	
C19	Gautam Rai	Correlated Miniband and Multivalley Physics in Two-Dimensional [Hetero]structures	Tim Wehling
C20	Lennart Klebl	Superconductivity and Magnetism in ABCB Quadlayer Graphene and biased Bernal Bilayer Graphene	Tim Wehling
C21	Jeison Fischer	Magnetic imaging of skyrmionic spin texture and path toward magnetic two-dimensional material	Extern
C22	Peter Kratzer	t.b.a.	Extern
C23	Wouter Jolie	Correlated quasiparticles in MoS <sub>2</sub> mirror twin boundaries on graphene	Extern