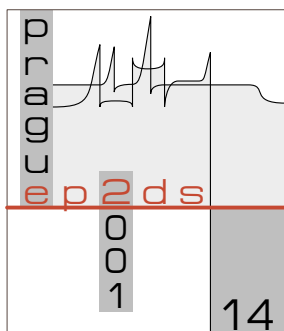


Proceedings of the Fourteenth International Conference on the Electronic Properties of Two-Dimensional Systems

EP2DS-14

held in Praha, Czech Republic
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Guest Editors:

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Preface

This volume contains 233 papers presented at the Fourteenth International Conference on the Electronic Properties of Two-Dimensional Systems (EP2DS-14), which was held in Praha, Czech Republic, at the hotel Pyramida and the nearby hostel Kajetánka, a facility of Charles University, from 30 July to 3 August 2001. It was attended by 376 participants from 33 countries. There were 13 invited talks, and another 293 contributions were selected by the Programme Committee from 492 submitted abstracts. As the selection process was far from perfect, we believe that the presented contributions make a representative cross section of recent works in the main topics of the Conference.

The EP2DS-14 conference was the fourteenth in the biennial series which was launched in Providence, Rhode Island, in 1975 and has continued to rotate between North America, Europe and Japan. The EP2DS community has remained to be, we believe, one of the most important ones in the semiconductor physics. It has meanwhile grown in size, and significant changes have also taken place in subjects of scientific interest. The focus of EP2DS conferences is now the fundamental physics related not only to two-dimensional electron systems, but also to one- and zero-dimensional systems. We were pleased to host the Conference on behalf of the European scientific community in the first year of the third millennium. It was wide in scope. The main attention was paid, in particular, to quantum Hall systems — especially ferromagnets, magnetic semiconductors, effects related to spin-orbit interactions, nuclear spin involved effects, localization and metal-insulator transitions, transport in laterally modulated systems, Kondo effect and spin blockade in quantum dots, real space and k -space mapping and various hybrid structures.

We have much pleasure in thanking several organizations and companies, in particular to

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for their support, and to

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for their sponsorship. Without this help, the Conference could not have been organized the way it was. We also wish to thank all members of the International Programme Committee for a really difficult work of selecting the papers, as well as all members of the International Advisory Committee for invaluable advice given to us, at various stages, on various aspects of the Conference. These colleagues have definitely ensured a well-conceived scope of the conference and the high quality of the presented contributions. We also thank the referees for reviewing the papers, which has, after all, enabled the publication of the present volume. Last but certainly not least, we would like to thank all conference participants who contributed significantly to a friendly scientific atmosphere during the Conference.

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List of Sections

1	Quantum Hall ferromagnets and phase transitions	5
2	Fractional quantum Hall effect	6
3	Integer quantum Hall effect	7
4	Transport in periodic and laterally modulated structures	8
5	Bilayer systems	10
6	Magnetic semiconductors	11
7	Spin-orbit interaction and polarization effects	12
8	Electron-phonon interaction effects	13
9	Optical properties of two-dimensional systems	14
10	Localization and metal-insulator transitions	16
11	Quantum wires and contacts	18
12	Quantum rings	19
13	Quantum dots and tunnelling	20
14	Hybrid structures and non-semiconductor systems	22

1 Quantum Hall ferromagnets and phase transitions

- EP-0264 **T. Jungwirth**, A.H. MacDonald and E.H. Rezayi: *Two-dimensional Ising physics in quantum Hall ferromagnets*
- EP-0365 **K. Muraki**, T. Saku and Y. Hirayama: *Activation studies of pseudospin quantum Hall ferromagnets in double quantum wells*
- EP-0570 V. Zhitomirsky, **R. Chughtai**, R.J. Nicholas and M. Henini: *Spin polarization of 2D electrons in the quantum Hall ferromagnet: Evidence for a partially polarized state around filling factor one*
- EP-0299 **J. Sinova**, A.H. MacDonald and S.M. Girvin: *Disorder and interactions in quantum Hall ferromagnets: Effects of disorder in Skyrmion physics*
- EP-0330 **G. Nachtwei**, A. Manolescu, N. Nestle and H. Künzel: *Ferromagnetism in a quantum Hall system due to exchange enhancement in a GaInAs quantum well*
- EP-0067 **Z.F. Ezawa**, K. Hasebe and A. Sawada: *SU(4) quantum coherence and interlayer tunneling in bilayer quantum Hall systems*
- EP-0291 A. Burkov, **J. Schliemann**, A.H. MacDonald and S. M. Girvin: *Phase transition and spin-wave dispersion in quantum Hall bilayers at filling factor $\nu = 1$*
- EP-0575 **N. Kumada**, D. Terasawa, Y. Shimoda, H. Azuhata, A. Sawada, Z.F. Ezawa, K. Muraki, T. Saku, and Y. Hirayama: *Various phase transitions in $\nu = 2/3$ bilayer quantum Hall states*
- EP-0348 **E.P. De Poortere**, E. Tutuc and M. Shayegan: *Hysteretic resistance spikes at transitions between quantum Hall ferromagnets in AlAs 2D electrons*
- EP-0495 E.E. Takhtamirov and **V.A. Volkov**: *Reduced symmetry of heterointerfaces and orientational pinning of quantum Hall stripe phase*
- EP-0106 **D. Yoshioka** and N. Shibata: *DMRG study of the ground state at higher Landau levels – stripes, bubbles and the Wigner crystal*
- EP-0003 **M. Taut**: *Wigner crystallization in a magnetic field: single electrons versus electron pairs at the lattice sites*

2 Fractional quantum Hall effect

- EP-0524 G. Yusa, H. Shtrikman and **I. Bar-Joseph**: *Photoluminescence in the fractional quantum Hall regime*
- EP-0216 **Moonsoo Kang**, A. Pinczuk, I. Dujovne, B.S. Dennis, L.N. Pfeiffer, and K.W. West: *Light scattering by magnetorotons of collective excitations in the fractional quantum Hall regime*
- EP-0310 **I. Szlufarska**, A. Wójs and J.J. Quinn: *Reversed-spin quasiparticles in fractional quantum Hall systems and their effect on photoluminescence*
- EP-0013 **A. Wójs** and J.J. Quinn: *Electron correlations in a partially filled first excited Landau level*
- EP-0641 **K. Shizuya**: *Effective vector-field theory and long-wavelength universality of the fractional quantum Hall effect*
- EP-0556 **S. Kraus**, J.G.S. Lok, W. Dietsche, K. von Klitzing, W. Wegscheider, and M. Bichler: *Finite wavevector scattering on the $\nu = 2/3$ huge longitudinal resistance*
- EP-0678 **T. Machida**, S. Ishizuka and K. Muraki: *Spin polarization in fractional quantum Hall edge channels*
- EP-0400 **M. Grayson**, D.C. Tsui, L.N. Pfeiffer, K.W. West and A.M. Chang: *The lever-arm model: Describing resonant tunneling under bias at a fractional quantum Hall edge*
- EP-0415 **M. Geller**: *Instantons tunneling into strongly correlated conductors*
- EP-0473 **V. Rodriguez**, P. Roche, D.C. Glatli, Y. Jin and B. Etienne: *Super poissonian noise in the FQHE regime*
- EP-0543 **R. Chughtai**, V. Zhitomirsky, R.J. Nicholas and M. Henini: *Measurements of the composite fermion masses and g-factors from the spin polarization of 2-D electrons in the region $1 > \nu > 2$*
- EP-0516 **S.I. Dorozhkin**, J.H. Smet, K. von Klitzing, V. Umansky, W. Wegscheider, R.J. Haug and K. Ploog: *Measurements of the compressibility of the composite fermion metallic state in a 2D electron system*
- EP-0387 **M. Onoda**, T. Mizusaki, and H. Aoki: *How heavy and how strongly interacting are composite fermions?*
- EP-0610 Y.-M. Cheng, T.-Y. Huang, **C.-T. Liang**, M.Y. Simmons, C.F. Huang, C.G. Smith, D.A. Ritchie and M. Pepper: *Experimental studies of composite fermion conductivity dependence on carrier density*
- EP-0480 P.D. Ye, **L.W. Engel**, D.C. Tsui, J.A. Simmons, J.R. Wendt, G.A. Vawter and J.L. Reno: *Microwave conductivity of antidot array in regime of fractional quantum Hall effect*
- EP-0597 **M. Tsaousidou** and G.P. Triberis: *Phonon-drag thermopower of composite fermions at filling factor $3/2$*
- EP-0652 **P. Sitko**: *Exclusion statistics of composite fermions*

3 Integer quantum Hall effect

- EP-0150 **J.G.S. Lok**, S. Kraus, W. Dietsche, K. von Klitzing, F. Schwerdt, M. Hauser, W. Wegscheider and M. Bichler: *Negative magneto-drag of double layer 2DEGs*
- EP-0636 **M. Huber**, M. Grayson, M. Rother, R.A. Deutschmann, W. Biberacher, W. Wegscheider, M. Bichler and G. Abstreiter: *Tunneling in the quantum Hall regime between orthogonal quantum wells*
- EP-0682 D.P. Druist, **E.G. Gwinn**, K.D. Maranowski and A.C. Gossard: *Tilted field effects in quantum Hall multilayers*
- EP-0344 **H.A. Walling**, D.P. Dougherty, D.P. Druist, E.G. Gwinn, K.D. Maranowski and A.C. Gossard: *Temperature dependence of vertical transport in quantum Hall multilayers*
- EP-0323 A. Tsukernik, M. Karpovskii, **A. Palevski**, V.J. Goldman, S. Luryi, A. Rudra, E. Kapon: *The role of spin polarization on the quantum Hall effect in 2DEG with periodically modulated filling factor*
- EP-0468 **M.P. Schwarz**, D. Grundler, H. Rolff, M. Wilde, S. Groth, Ch. Heyn, and D. Heitmann: *De Haas-van Alphen effect in a two-dimensional electron system*
- EP-0379 **N.G. Kalugin**, Yu.B. Vasilyev, S.D. Suchalkin, G. Nachtwei, B.E. Sagol and K. Eberl: *Time-resolved far-infrared spectroscopy of quantum Hall systems*
- EP-0511 **W. Desrat**, D.K. Maude, M. Potemski, J.C. Portal, Z.R. Wasilewski and G. Hill: *Resistively detected NMR in the quantum Hall regime*
- EP-0616 **R.G. Mani**, W.B. Johnson, V. Narayanamurti, V. Privman and Y.-H. Zhang: *Nuclear spin based memory and logic in quantum Hall semiconductor nanostructures for quantum computing applications*
- EP-0430 **M. Koshino**, H. Aoki and T. Osada: *Field-induced SDW and integer quantum Hall effect in anisotropic three-dimensional electron systems*
- EP-0305 **K. Takashina**, R.J. Nicholas, B. Kardynal, N.J. Mason, D.K. Maude and J.C. Portal: *The quantum Hall effect in an InAs/GaSb based electron-hole system and its current-driven breakdown*
- EP-0383 **E. Ahlswede**, J. Weis, K. von Klitzing and K. Eberl: *Hall potential distribution in the quantum Hall regime in the vicinity of a potential probe contact*
- EP-0021 K. Morita, S. Nomura, H. Tanaka, H. Kawashima and **S. Kawaji**: *Current polarity characteristics in breakdown of the integer quantum Hall effect in GaAs/AlGaAs heterostructures*
- EP-0435 **K. Oto**, T. Sanuki, S. Takaoka, K. Murase, and K. Gamo: *Two types of breakdown of quantum Hall effect depending on the electron density fluctuation*
- EP-0615 **O. Makarovskiy**, A.C. Neumann, L.A. Dickinson, L. Eaves, P.C. Main, M. Henini, S. Thoms, and C.D.W. Wilkinson: *Quantum Hall effect breakdown: Can the bootstrap heating and inter-Landau-level scattering models be reconciled?*
- EP-0360 G. Schwarz, E. Schöll, **V. Novák**, and W. Prettl: *Streamer motion in Hall effect Corbino geometries*

4 Transport in periodic and laterally modulated structures

- EP-0519 **T. Asayama**, Y. Tokura, S. Miyashita, M. Stopa and S. Tarucha: *1D Bragg reflector in the Tomonaga-Luttinger liquid regime and Fermi liquid regimes*
- EP-0207 C. Naud, G. Faini, **D. Maily**, J. Vidal, B. Douçot, G. Montambaux, A. Wieck, D. Reuter: *Aharonov-Bohm cages in the GaAlAs/GaAs system*
- EP-0234 **T. Kimura**, H. Tamura, K. Shiraishi and H. Takayanagi: *Magnetic field effects on the ferromagnetism and transport properties of Kagome dot superlattices*
- EP-0364 **Y. Iye**, A. Endo, S. Katsumoto, Y. Ohno, S. Shimomura and S. Hiyamizu: *Magnetotransport in ultrashort period unidirectional lateral superlattices*
- EP-0377 **R.R. Gerhardt**s and S.D.M. Zwerschke: *Magnetoresistance in rectangular superlattices: Guiding-center approach to commensurability oscillations*
- EP-0249 **C. Mitzkus**, W. Kangler, D. Weiss, V. Umansky and W. Wegscheider: *Anomalous temperature dependence of commensurability oscillations in one- and two-dimensional lateral superlattices*
- EP-0259 **K.W. Edmonds**, B.L. Gallagher, P.C. Main, A. Nogaret, M. Henini, C.H. Marrows and D.S. Macintyre: *Magnetoresistance oscillations in a periodic magnetic field due to internal Landau band structure*
- EP-0250 **W. Breuer**, D. Weiss and V. Umansky: *Commensurability effects in two-dimensional electron gases with periodically arranged Ni and NiFe nanopillars*
- EP-0632 **A. Nogaret**, D.N. Lawton, D.K. Maude, J.C. Portal and M. Henini: *Magnetic waveguiding in tilted magnetic fields*
- EP-0507 **M. Hara**, A. Endo, S. Katsumoto and Y. Iye: *Magnetotransport in 2DEG with magnetic barriers*
- EP-0326 **Jinki Hong**, V. Kubrak, K.W. Edmonds, A.C. Neumann, B.L. Gallagher, P.C. Main, M. Henini, C.H. Marrows, B.J. Hickey and S. Thoms: *Quasi-ballistic transport of 2D electrons through magnetic barriers*
- EP-0263 **J. Wakabayashi**, Y. Tsuzuki, A. Endo and Y. Iye: *Resonance-like giant magnetotransport anomaly in GaAs/AlGaAs heterostructures with a single Ni dot*
- EP-0605 **E.G. Novik**, H. Buhmann, S. Maximov, and L.W. Molenkamp: *Electron-wave diffraction by density inhomogeneities in two-dimensional electron gas*
- EP-0200 **K.S. Novoselov**, A.K. Geim, S.V. Dubonos, Y.G. Cornelissens, F.M. Peeters and J.C. Maan: *Quenching of the Hall effect in localised high magnetic field region*
- EP-0261 **O. Voskoboynikov**, H.C. Huang, C.P. Lee and O. Tretyak: *Spin dependent electron scattering from quantum dots and antidots in twodimensional channels*
- EP-0307 **J. Wiersig** and K.-H. Ahn: *Mode-locking in a periodic array of scatterers*
- EP-0576 F. Evers, A.D. Mirlin, **D.G. Polyakov** and P. Wölfle: *Magnetotransport in a random array of antidots*
- EP-0577 **M. Kuraguchi**, E. Ohmichi, T. Osada and Y. Shiraki: *Relationship between Stark-cyclotron resonance and angular dependent magnetoresistance oscillations*
- EP-0645 **G.A. Luna-Acosta**, J.A. Méndez-Bermúdez, and F.M. Izrailev: *Chaotic electron motion in superlattices. quantum-classical correspondence of the structure of eigenstates and LDOS*

- EP-0030 **T. Osada**: *Resonant tunneling tuned by magnetic field orientations in anisotropic multilayer systems*
- EP-0694 Z.S. Gribnikov, R.R. Bashirov, H. Eisele, **V.V. Mitin** and G.I. Haddad: *Electron dispersion relations with negative effective masses in quantum wells grown on the cleaved edge of a superlattice*
- EP-0587 R.A. Deutschmann, **W. Wegscheider**, M. Rother, M. Bichler and G. Abstreiter: *Miniband transport in vertical superlattice field effect transistors*
- EP-0561 **C. Pacher**, G. Strasser, E. Gornik, F. Elsholz, G. Kießlich, A. Wacker and E. Schöll: *Optics with ballistic electrons: Anti-reflection coatings for GaAs/AlGaAs superlattices*
- EP-0457 **D. Grundler**, T. Hengstmann, N. Klockmann, Ch. Heyn and D. Heitmann: *Bend-resistance nanomagnetometry: Spatially resolved magnetization studies in ferromagnet/semiconductor hybrid structures*

5 Bilayer systems

- EP-0654 **C. Petchsingh**, R.J. Nicholas, K. Takashina, N.J. Mason and J. Zeman: *Mass enhancement and electron-hole coupling studied by cyclotron resonance in InAs/GaSb bilayers*
- EP-0366 **T.O. Stadelmann**, B. Kardynal, R.J. Nicholas, K. Takashina and N.J. Mason: *Magnetotransport studies of antidot superlattices in coupled two-dimensional electron-hole gases*
- EP-0621 **J.B. Doveston**, S. Djordjevic, R.B. Dunford, C.J. Mellor, F.I.B. Williams, M. Henini: *Microwave and transport studies of the magnetically-induced insulating phase of bilayer hole systems*
- EP-0525 **Yu.V. Dubrovskii**, R. Hill, V.A. Volkov, P.C. Main, L. Eaves, V.G. Popov, E.E. Vdovin, D.Yu. Ivanov, D.K. Maude, J.C. Portal, M. Henini and G. Hill: *Magnetic field induced linear Coulomb gap in tunnelling between disordered two-dimensional electron systems*
- EP-0629 **A.R. Hamilton**, M.Y. Simmons, C.B. Hanna, J.C. Díaz-Vélez, M. Pepper and D.A. Ritchie: *Exchange-driven bilayer-to-monolayer charge transfer in an asymmetric double-quantum-well*
- EP-0483 **E. Anisimovas**: *Tunneling spectroscopy of modulated two-dimensional electron systems*
- EP-0295 **J. Kolorenč**, L. Smrčka, P. Středa: *Longitudinal conductivity and transverse charge redistribution in coupled quantum wells subject to in-plane magnetic fields*
- EP-0035 **P. Svoboda**, Yu. Krupko, L. Smrčka, M. Cukr, T. Jungwirth, L. Jansen: *Novel critical field in magneto-resistance oscillation of 2DEG in asymmetric GaAs/Al_{0.3}Ga_{0.7}As double wells measured as a function of the in-plane magnetic field*
- EP-0613 **R. López**, D. Sánchez and G. Platero: *Photoassisted dynamical transport in multiple quantum wells*
- EP-0515 **N.E. Kaputkina** and Yu.E. Lozovik: *Two-dimensional exciton with spatially-separated carriers in coupled quantum wells in external magnetic field*
- EP-0252 **D.C. Marinescu**, J.J. Quinn and G.F. Giuliani: *Quasiparticle lifetime in a bilayer system*
- EP-0572 **M. Zvára**, R. Grill, P. Hlídek, M. Orlita and J. Soubusta: *Photoluminescence of biased GaAs/Al_xGa_{1-x}As double quantum wells – many-body effects*

6 Magnetic semiconductors

- EP-0265 **P. Kossacki**, A. Kudelski, J.A. Gaj, J. Cibert, S. Tatarenko, D. Ferrand, A. Wasiela, B. Deveaud and T. Dietl: *Light controlled and probed ferromagnetism of (Cd,Mn)Te quantum wells*
- EP-0274 **F. Matsukura**, D. Chiba, T. Omiya, E. Abe, T. Dietl, Y. Ohno, K. Ohtani and H. Ohno: *Control of ferromagnetism in field-effect transistor of a magnetic semiconductor*
- EP-0593 **F.J. Teran**, M. Potemski, D.K. Maude, A.K. Hassan T. Andrearczyk, J. Jaroszyński, Z. Wilamowski, T. Wojtowicz, G. Karczewski: *Resistively detected EPR of Mn^{2+} ions coupled to the 2DEG in the quantum Hall regime*
- EP-0619 T. Andrearczyk, J. Jaroszyński, G. Karczewski, J. Wróbel, T. Wojtowicz, **T. Dietl**, E. Papis, E. Kamińska and A. Piotrowska: *Effects of spin polarization on electron transport in modulation doped $Cd_{1-x}Mn_xTe/Cd_{1-y}Mg_yTe:I$ heterostructures*
- EP-0647 **H. Luo**, B.D. McCombe, M.H. Na, K. Mooney, F. Lehmann, X. Chen, M. Cheon and S.M. Wang: *Transport and magnetic properties of ferromagnetic GaAs/Mn digital alloys*
- EP-0441 **F. Takano**, S. Kuroda, K. Takita, T. Takamasu, Y. Imanaka and G. Kido: *Magnetoresistance of two-dimensional electrons in modulation-doped $Cd_{1-x}Mn_xTe/Cd_{1-y}Mg_yTe$ SQWs : The variation with carrier concentration*
- EP-0536 **Y. Imanaka**, T. Takamasu, G. Kido, G. Karczewski, T. Wojtowicz and J. Kossut: *Singularity in the magneto-luminescence of II-VI quantum Hall systems around $\nu = 1$*
- EP-0337 **J. König**, J. Schliemann, T. Jungwirth, A.H. MacDonald: *Collective spin fluctuations in diluted magnetic semiconductors*
- EP-0066 H.J. Kim, **K.S. Yi**, N.M. Kim, S.J. Lee and J.J. Quinn: *Finite temperature study of a modulation-doped DMS quantum well with broken spin symmetry*
- EP-0418 **L. Brey** and F. Guinea: *Phase separation in diluted magnetic semiconductor quantum wells*
- EP-0395 V.K. Dugaev and **J. Barnas**: *Large enhancement of the electron-electron interaction constant in magnetic layered structures*

7 Spin-orbit interaction and polarization effects

- EP-0328 **C.M. Hu**, J. Nitta, A. Jensen, J.B. Hansen, H. Takayanagi, T. Matsuyama, D. Grundler, G. Meier, D. Heitmann and U. Merkt: *Spin injection into a two-dimensional electron gas using inter-digital-ferromagnetic contacts*
- EP-0072 **Y. Sato**, S.-I. Gozu, T. Kita and S. Yamada: *Study for realization of spin-polarized field effect transistor in $In_{0.75}Ga_{0.25}As/In_{0.75}Al_{0.25}As$ heterostructure*
- EP-0440 **H.B. Sun**, M.C. de Oliveira and D. Wahyu: *Quantum dynamics of spin polarized optoelectronic processes*
- EP-0671 **M. Beck**, P. Kiesel, S. Malzer and G.H. Döhler: *Spin transport driven by giant ambipolar diffusion*
- EP-0372 Y.-M. Cheng, T.-Y. Huang, C.H. Pao, C.-C. Lee, **C.-T. Liang**, M.Y. Simmons, C.G. Smith, D.A. Ritchie, M. Pepper, G.-H. Kim and J.Y. Leem: *Spin-dependent transport in a two-dimensional GaAs electron gas in a parallel magnetic field*
- EP-0552 **Y.S. Gui**, J. Liu, V. Daumer, C.R. Becker, H. Buhmann and L.W. Molenkamp: *Large Rashba spin-orbit splitting in gate controlled n-type modulation doped $HgTe/Hg_{0.3}Cd_{0.7-x}Mn_xTe$ quantum wells*
- EP-0482 **E. Tutuc** and M. Shayegan: *Measurements of the effective g-factor in dilute GaAs 2D electrons*
- EP-0338 T.-Y. Huang, Y.-M. Cheng, **C.-T. Liang**, G.-H. Kim and J.Y. Leem: *Exchange-enhanced Landé g-factor, effective disorder and collapse of spin-splitting in a two-dimensional GaAs electron system*
- EP-0668 **R. Winkler**, H. Noh, E. Tutuc and M. Shayegan: *Anomalous giant Rashba spin splitting in two-dimensional hole systems*
- EP-0539 **K. Fujii**, Y. Morikami and T. Ohshima: *Determination of Rashba spin splitting in $In_xGa_{1-x}As/In_yAl_{1-y}As$ by far-infrared magneto-optical absorption*
- EP-0238 **S. Lamari**: *Zero field spin-splitting and Rashba parameter in inversion layers on p-InAs mosfets: results of fully numerical multi-band computations*
- EP-0542 Z. Wilamowski and **W. Jantsch**: *ESR studies of the Bychkov-Rashba field in modulation doped Si/SiGe quantum wells*

8 Electron-phonon interaction effects

- EP-0153 C.L. Yang, M.A. Zudov, J. Zhang, **R.R. Du** and J.A. Simmons: *Magnetophonon resonance of two-dimensional electrons by leaky interface-acoustic phonons*
- EP-0257 C. Brink, **D. Schneider**, G. Ploner, G. Strasser, E. Gornik: *Magnetophonon resonance in the confinement of an n-GaAs/AlGaAs-heterojunction, tuned to a quasi-one-dimensional quantum wire*
- EP-0660 **E.E. Onishchenko**, V.S. Bagaev, T.I. Galkina, V.V. Zaitsev and A.I. Sharkov: *New method of detection of terahertz acoustic phonons in quantum well structures*
- EP-0673 M. Eckardt, A. Schwanhäußer, L. Robledo, S. Malzer, **G.H. Döhler**, M. Betz, A. Leitenstorfer: *Ballistic high-field transport in mesoscopic confining potentials – observation of THz oscillations in $Al_xGa_{1-x}As$ heterostructures*
- EP-0546 **B.A. Glavin**, V.A. Kochelap, T.L. Linnik, K.W. Kim and M.A. Stroscio: *Voltage-controlled generation of high-frequency coherent acoustic phonons in biased superlattices*
- EP-0024 **R.B. Dunford**, M.R. Gates, C.J. Mellor, V.W. Rampton, J.S. Chauhan, J.R. Middleton and M. Henini: *The acoustoelectric effect in double layer AlGaAs/GaAs 2D hole systems*
- EP-0453 **J. Ebbecke**, K. Pierz, F.J. Ahlers: *Influence of the shape of a quasi-one-dimensional channel on the quantized acousto-electric current*
- EP-0384 **M.E. Portnoi** and V.M. Apalkov: *Electron-phonon interaction in a two-subband quasi-2D system in quantizing magnetic field*
- EP-0566 **F. Schulze-Wischeler**, U. Zeitler, F. Hohls, R.J. Haug, D. Reuter and A.D. Wieck: *Phonon excitation of a two-dimensional electron system around $\nu = 1$*
- EP-0028 **R. Fletcher**, M. Tsousidou, P.T. Coleridge, Y. Feng and Z.R. Wasilewski: *Electron-phonon coupling and phonon drag thermopower of a very low mobility 2DEG*
- EP-0633 **E.M. Höhberger**, R.H. Blick, F.W. Beil, W. Wegscheider, M. Bichler and J.P. Kotthaus: *Magnetotransport in freely suspended two-dimensional electron systems for integrated nanomechanical resonators*
- EP-0651 D. Romanov, **V. Mitin** and M. Stroscio: *Polar surface vibration strips on GaN/AlN quantum dots and their interaction with confined electrons*

9 Optical properties of two-dimensional systems

- EP-0195 **P. Hawrylak**, F.J. Teran, M. Potemski, G. Karczewski: *Band-gap renormalization and photoluminescence from an interacting two-dimensional electron gas in a magnetic field*
- EP-0656 **H.A. Nickel**, T. Yeo, C.J. Meining, A.B. Dzyubenko, M. Furis, D.R. Yakovlev, B.D. McCombe and A. Petrou: *Interaction of an electron gas with photoexcited electron-hole pairs in modulation-doped GaAs and CdTe quantum wells*
- EP-0614 **S. Maćkowski**, G. Karczewski, and J. Kossut: *Optical properties of CdTe/ZnTe quantum dot superlattices*
- EP-0595 **C.M. Townsley**, Y.H. Kim, R.J. Nicholas, K.A. Prior and B.C. Cavenett: *Anomalous g-factors and diamagnetic shifts of biexcitons in ZnS quantum wells*
- EP-0407 **W. Ossau**, D.R. Yakovlev, G.V. Astakhov, A. Waag, C.J. Meining, H.A. Nickel, B.D. McCombe and S.A. Crooker: *High magnetic field optical studies of 2DEG in modulation doped ZnSe quantum wells*
- EP-0224 **M. Hayne**, T. Vanhoucke, M. Henini and V.V. Moshchalkov: *Magnetophotoluminescence of positively-charged excitons in GaAs quantum wells*
- EP-0523 **C. Bardot**, M. Potemski, G. Martinez, A. Riedel, R. Hey and K.J. Friedland: *Intrinsic magnetophotoluminescence of a two dimensional electron gas with high concentration and mobility in a symmetric quantum well*
- EP-0466 **B.M. Ashkinadze**, V. Voznyy, E. Cohen, Arza Ron and V. Umansky: *Magnetic field induced evolution from bulk exciton to 2DEG – free hole luminescence in modulation doped heterojunctions*
- EP-0019 A. Qarry, R. Rapaport, G. Ramon, **E. Cohen**, Arza Ron, A. Maan and L.N. Pfeiffer: *Magnetic field effect on the free electron - exciton scattering in GaAs/AlGaAs bare quantum wells and in microcavities*
- EP-0591 **T. Takamasu**, S. Takagi, Y. Imanaka and G. Kido: *Photoluminescence spectra measured in the quantum Hall system with different well width samples*
- EP-0005 **H.P. van der Meulen**, J.M. Calleja, J. Sanchez, R. Hey, K.J. Friedland and K. Ploog: *Anomalous magneto-optical properties of a two-dimensional electron gas around integer filling factors*
- EP-0574 **A.S. Plaut**, A. Pinczuk, B.S. Dennis, C.F. Hirjibehedin, L.N. Pfeiffer and K.W. West: *Optical investigation of high-mobility dilute two-dimensional hole gases in GaAs (311)A quantum structures*
- EP-0135 **C. Riva**, F.M. Peeters, K. Varga: *Theory of Trions in quantum wells*
- EP-0121 L.C.O. Dacal and **J.A. Brum**: *Effects of an electron gas on the negative trion in semiconductor quantum wells*
- EP-0438 **M.R. Singh** and J. Desforges: *Excitons formation from spatially separated electrons and holes in semiconductor nanostructures with disorder*
- EP-0427 N.A. Fromer, **C. Schüller**, D.S. Chemla, T.V. Shahbazyan, I.E. Perakis, D. Driscoll and A.C. Gossard: *Femtosecond dynamics of inter-Landau level excitations of a two dimensional electron gas in the quantum Hall regime*
- EP-0378 **S.-J. Cheng** and R.R. Gerhardts: *New collective modes in wide quantum wells with in-plane magnetic fields*

- EP-0355 D. Porras, J. Fernández-Rossier and **C. Tejedor**: *Coherent control and four wave-mixing of Fermi edge singularities in doped quantum wells*
- EP-0258 **D. Schneider**, F. Hitzel, A. Schlachetzki, P. Boensch: *Dependence of electron effective mass on the subband occupation in $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}/\text{InP}$ quantum wells*
- EP-0243 K. Shibata, **N. Kotera**, H. Arimoto, N. Miura, Yongjie Wang, E.D. Jones, J.L. Reno, M. Washima, T. Mishima: *Study of band nonparabolicity using electron cyclotron resonance of $\text{InGaAs}/\text{InAlAs}$ quantum wells below 100 Tesla*
- EP-0674 **M. Vitzethum**, R. Schmidt, P. Kiesel, P. Schafmeister, J. Koch, D. Reuter, A.D. Wieck and G.H. Döhler: *A novel photoconductive detector for single photon detection*
- EP-0432 **L.V. Kulik**, I.V. Kukushkin, V.E. Kirpichev, J.H. Smet, K. von Klitzing, V. Umansky, W. Wegscheider: *Cyclotron spin-flip excitations in the 2D-electron system*
- EP-0390 H. Aikawa, **S. Takaoka**, K. Oto, K. Murase, T. Saku, Y. Hirayama, S. Shimomura and S. Hiyamizu: *In-plane magnetic field dependence of cyclotron resonance in two-dimensional electron systems*
- EP-0568 **C. Faugeras**, J. Zeman, D.K. Maude, M. Potemski, G. Martinez, A. Riedel, R. Hey, K.J. Friedland: *Magneto infrared absorption and polaron coupling in high electron density GaAs quantum well*

10 Localization and metal-insulator transitions

- EP-0463 **M.E. Gershenson**, V.M. Pudalov, H. Kojima, N. Butch, E.M. Dizhur, G. Brunthaler, A. Prinz and G. Bauer: *Crossed magnetic fields technique for studying spin and orbital properties of 2d electrons in the dilute regime*
- EP-0088 **T. Heinzl**, R. Jäggi, M. von Waldkirch, E. Ribeiro, K. Ensslin, S.E. Ulloa, G. Medeiros-Ribeiro and P.M. Petroff: *Transport signatures for correlated disorder in self-assembled InAs quantum dots on GaAs*
- EP-0638 **A.K. Savchenko**, Y.Y. Proskuryakov, S.S. Safonov, S.H. Roshko, M. Pepper, M.Y. Simmons, D.A. Ritchie, A.G. Pogosov, Z.D. Kvon: *Fermi-liquid behaviour near the crossover from ‘metal’ to ‘insulator’ of 2D electron and hole systems*
- EP-0317 **C. Possanzini**, L. Ponomarenko, D. de Lang, A. de Visser, S.M. Olsthoorn, R. Fletcher, Y. Feng, P.T. Coleridge, R.L. Williams and J.C. Maan: *Scaling behavior of metal-insulator transitions in a Si/SiGe two-dimensional hole gas*
- EP-0479 S. Bogdanovich and **D. Popović**: *Glass transition in a two-dimensional electron system in silicon*
- EP-0481 **V. Dobrosavljević** and A.A. Pastor: *Glassy behavior of electrons as a precursor to the localization transition*
- EP-0280 **J. Jaroszyński**, D. Popović and T.M. Klapwijk: *Low-frequency resistance noise studies across the metal-insulator transition in silicon MOSFETs*
- EP-0431 **A. Lewalle**, M. Pepper, C.J.B. Ford, D.J. Paul, N. Griffin, B.P. Coonan, G. Redmond and G.M. Crean: *Investigation of the zero-field 2D “metallic” state with r_S and k_{FL} controlled independently*
- EP-0014 T. Yeo, **B.D. McCombe**, B.M. Ashkinadze and L.N. Pfeiffer: *Metal-insulator transition of spatially separated electrons and holes in mixed type I-type II GaAs/AlAs quantum wells*
- EP-0459 **A.A. Shashkin**, S.V. Kravchenko, V.T. Dolgoplov and T.M. Klapwijk: *Possible ferromagnetic instability in a dilute 2D electron system*
- EP-0073 **V. Kagalovsky**, B. Horovitz and Y. Avishai: *Random matrix theory and metal-insulator transition in disordered superconductors*
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- EP-0288 I.V. Gornyi, **A.D. Mirlin** and P. Wölfle: *Current correlations and quantum localization in a random or homogeneous magnetic field*
- EP-0549 **H. Kobori**, N. Hatta, M. Kawaguchi and T. Ohyama: *Magnetic-field-induced two- to three-dimensional transition in weak localization and weak anti-localization regimes for $\text{In}_2\text{O}_{3-x}$ thin films*
- EP-0643 C.E. Yasin, **M.Y. Simmons**, A.R. Hamilton, N.E. Lumpkin, R.G. Clark, L.N. Pfeiffer and K.W. West: *The fate of quantum Hall extended states as $B \rightarrow 0$ and the possibility of a 2D metal*
- EP-0316 A.L.C. Pereira and **P.A. Schulz**: *Extended state floating up in a lattice model: Bona fide levitation fingerprints, irrespective of the correlation length*

- EP-0341 T. Koschny and **L. Schweitzer**: *Influence of correlated disorder potentials on the levitation of current carrying states in the quantum Hall effect*
- EP-0370 **Gil-Ho Kim**, J.T. Nicholls, C.-T. Liang, D.A. Ritchie, and S.I. Khondaker: *Insulator-quantum Hall liquid transitions in a two-dimensional electron gas using self-assembled InAs dots*
- EP-0349 **K. Buth**, M. Widmann, U. Merkt, E. Batke and K. Eberl: *Percolation of quantum Hall droplets in intentionally disordered GaAs/GaAlAs heterojunctions*
- EP-0510 **D.T.N. de Lang**, L. Ponomarenko, A. de Visser, C. Possanzini, S.M. Olsthoorn and A.M.M. Pruisken: *Evidence for a quantum Hall insulator in an InGaAs/InP heterostructure*
- EP-0565 **F. Hohls**, U. Zeitler and R.J. Haug: *Variable-range hopping in the quantum Hall regime*
- EP-0284 U. Zülicke, **E. Shimshoni**: *Localization of the Hall resistivity at high magnetic fields: Absence of the quantized Hall insulator*

11 Quantum wires and contacts

- EP-0504 **M.A. Topinka**, B.J. LeRoy, R.M. Westervelt, K.D. Maranowski and A.C. Gossard: *Imaging coherent electron wave flow in a two-dimensional electron gas*
- EP-0599 **K. Ueno**, M. Eto and K. Kawamura: *Interband scattering at metallic nano-junctions*
- EP-0659 **L. Worschech**, S. Reitzenstein, M. Kesselring, A. Schliemann and A. Forchel: *Coherent and ballistic switching effects in GaAs/AlGaAs nanojunctions*
- EP-0362 **T. Ihn**, J. Rychen, T. Cilento, R. Held, K. Ensslin, W. Wegscheider and M. Bichler: *Scanning gate measurements on a quantum wire*
- EP-0363 **R. Crook**, C.G. Smith, M.Y. Simmons and D.A. Ritchie: *Imaging electrostatic microconstrictions in long 1D wires*
- EP-0608 **I.A. Larkin**, J.H. Jefferson and A.V. Vagov: *Ballistic transport of electrons in a long single-mode 1-D channel*
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- EP-0046 **K.J. Thomas**, J.T. Nicholls, D.R. Mace, M.Y. Simmons, D.A. Ritchie and M. Pepper: *Effect of temperature and magnetic field on the 0.7 structure in a ballistic one-dimensional wire*
- EP-0109 **Y. Tokura** and A. Khaetskii: *Towards a microscopic theory of the 0.7 anomaly*
- EP-0047 **H. Buhmann** and L.W. Molenkamp: *1D diffusion: A novel transport regime in narrow 2DEG channels*
- EP-0309 **H.-S. Sim**, G. Ihm, N. Kim, S.J. Lee and K.J. Chang: *Edge-channel transport through quantum wires with a magnetic quantum dot*
- EP-0458 J. Rubio, C. Pascual, A. Pinczuk, B.S. Dennis, L.N. Pfeiffer, K.W. West and **J.M. Calleja**: *Optical study of the one-dimensional electron gas in cleaved-edge-overgrown semiconductor quantum wires*
- EP-0554 **M. Yamamoto**, M. Stopa, Y. Tokura, Y. Hirayama and S. Tarucha: *Coulomb drag between quantum wires: Magnetic fields and negative anomaly*
- EP-0015 D. Boese, M. Governale, A. Rosch, **U. Zülicke**: *Magnetotunneling between parallel quantum wires: From coherent oscillations to spin-charge separation*
- EP-0361 **J. Haruyama**, I. Takesue and T. Hasegawa: *Anti-localization caused by slight doping of heavy-mass impurities in carbon nanotubes and a novel spintronics device*
- EP-0181 **O.V. Kibis**: *Electronic phenomena in chiral carbon nanotubes in presence of a magnetic field*
- EP-0100 **I. Milošević**, T. Vuković, S. Dmitrović and M. Damnjanović: *Electro-optical properties of single-walled Carbon nanotubes*
- EP-0672 **G. Cuniberti**, R. Gutierrez, G. Fagas, F. Grossmann, K. Richter and R. Schmidt: *Fullerene based devices for molecular electronics*

12 Quantum rings

- EP-0367 **J. Nitta**, T. Koga, and H. Takayanagi: *Interference of Aharonov-Bohm ring structures affected by spin-orbit interaction*
- EP-0555 **Jeng-Bang Yau**, E.P. De Poortere and M. Shayegan: *Aharonov-Bohm oscillations measured in two-dimensional GaAs holes*
- EP-0308 **N.T. Bagraev**, A.D. Bouravleuv, W. Gehlhoff, V.K. Ivanov, L.E. Klyachkin, A.M. Malyarenko, S.A. Rykov, I.A. Shelykh: *Spin-dependent single-hole tunneling in self-assembled silicon quantum rings*
- EP-0648 Z. Xie and **S.A. Lyon**: *4-terminal reflection and transmission in an Aharonov-Bohm ring*
- EP-0298 **A.E. Hansen**, A. Kristensen, S. Pedersen, C.B. Sørensen, and P.E. Lindelof: *Decoherence in Aharonov-Bohm rings*
- EP-0477 **A.W. Holleitner**, H. Qin, R.H. Blick, K. Eberl and J.P. Kotthaus: *Aharonov-Bohm oscillations for charge transport through two parallel quantum dots*
- EP-0534 A.A. Bykov, **O. Estibals**, I.V. Marchishin, L.V. Litvin, A.K. Bakarov, A.I. Toropov, D.K. Maude and J.C. Portal: *Small ring interferometer on the basis of a GaAs quantum well with a high density 2D electron gas*
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- EP-0209 A. Emperador, M. Pi, **M. Barranco** and E. Lipparini: *Spin features in the Raman spectrum of nanoscopic rings*
- EP-0038 **S.E. Ulloa**, A.O. Govorov, A.V. Kalameitsev, R. Warburton and K. Karrai: *Magnetoexcitons in quantum-ring structures: a novel magnetic interference effect*

13 Quantum dots and tunnelling

- EP-0273 **P.C. Main**, A. Patanè, R.J.A. Hill, A. Levin, L. Eaves, M. Henini, D.G. Austing, S. Tarucha, Yu.V. Dubrovskii and E.E. Vdovin: *Mapping the wave functions in quantum dots*
- EP-0630 **I. Hapke-Wurst**, U. Zeitler, R.J. Haug and K. Pierz: *Mapping the g-factor anisotropy of InAs self-assembled quantum dots*
- EP-0637 **S. Sasaki**, Y. Kitamura, W. Izumida, K. Ono, S. Tarucha: *The Kondo effect in a one- and two-electron quantum dot*
- EP-0313 R. López, R. Aguado, **G. Platero** and C. Tejedor: *Transport in quantum dots in the Kondo regime under the influence of an AC potential*
- EP-0578 **Z.D. Kvon**, O. Estibals, A.Y. Plotnikov, J.C. Portal, A.I. Toropov and J.L. Gauffier: *Single-electron conductance oscillations of small open quantum dot*
- EP-0541 **A.L. Chudnovskiy** and S.E. Ulloa: *Kondo effect in a two-level quantum dot coupled to an external fermionic reservoir*
- EP-0529 **S.I. Erlingsson**, Yu.V. Nazarov and V.I. Fal'ko: *Hyperfine-mediated spin-flip transitions in GaAs quantum dots*
- EP-0626 **S.J. Geer**, A.G. Davies, C.G. Smith, L.D. Macks, W.R. Tribe, E.H. Linfield, C.A.G. Jones and D.A. Ritchie: *Investigation of an open quantum dot with a Coulomb blockade quantum dot detector*
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- EP-0506 **B. Hackens**, C. Gustin, V. Bayot and M. Shayegan: *Evidence for spin-orbit effects in an open ballistic quantum dot*
- EP-0503 **G. Kießlich**, A. Wacker and E. Schöll: *Sequential tunneling through an array of electrostatically coupled quantum dots*
- EP-0154 **V. Ryzhii**: *Negative differential infrared photoconductivity in quantum-dot structure*
- EP-0502 **Yu.N. Khanin**, E.E. Vdovin, L. Ponomarenko and K.S. Novoselov: *Resonant tunnelling via states of the X-related donors located at different atomic layer in AlAs barrier*
- EP-0374 **J. Königmann**, P. König, E. McCann, V.I. Fal'ko, R.J. Haug: *Correlations in the local density of states probed by single electron tunneling*
- EP-0475 **O.M. Bulashenko**, J.M. Rubí: *Shot noise as a tool to probe an electron energy distribution*
- EP-0596 S.H. Roshko, S.S. Safonov, **A.K. Savchenko**, W.R. Tribe and E.H. Linfield: *Suppressed shot noise in 1D and 2D electron transport via localized states*
- EP-0375 **A. Nauen**, J. Königmann, U. Zeitler, F. Hohls, R.J. Haug: *Shot noise in tunneling through single localized states*
- EP-0314 M.K.K. Nakaema, M.J.S.P. Brasil, **F. Iikawa**, E. Ribeiro, T. Heinzl, K. Ensslin, G. Medeiros-Ribeiro, P.M. Petroff and J.A. Brum: *Micro-photoluminescence of self-assembled quantum dots in the presence of an electron gas*
- EP-0467 **A. Wysmolek**, M. Potemski, V. Thierry-Mieg, R. Planel: *Single-dot-like emission induced by high magnetic fields*

- EP-0590 **M. Tadić** and F.M. Peeters: *Electronic structure of the valence band in cylindrical strained InP/InGaP quantum dots in an external magnetic field*
- EP-0623 **S.A. Mikhailov**: *Few-electron quantum dots and disks in zero magnetic field: Possible indications on a liquid-solid transition*
- EP-0241 **J. Kainz**, S.A. Mikhailov, A. Wensauer and U. Rössler: *Ground state energies of quantum dots in high magnetic fields: A new approach*
- EP-0342 **R. Krahne**, V. Gudmundsson, Ch. Heyn and D. Heitmann: *Inter-dot interaction in an array of elliptical quantum dots*
- EP-0346 **D.G. Austing**, S. Sasaki, K. Muraki, K. Ono, S. Tarucha, M. Barranco, A. Emperador, M. Pi and F. Garcias: *Influence of mismatch on the addition energy spectra of vertical diatomic artificial molecules*
- EP-0526 **M. Bayer**, G. Ortner, A. Larionov, V. Timofeev, A. Forchel, P. Hawrylak, K. Hinzer, M. Korkusinski, S. Fafard and Z. Wasilewski: *Entangled exciton states in quantum dot molecules*
- EP-0634 **D. Sánchez**, L. Brey and G. Platero: *Canted phase in artificial molecules*
- EP-0042 **K. Král**, Z. Khás, P. Zdeněk, M. Čerňanský and C.Y. Lin: *Relaxation of electron energy in polar semiconductor double quantum dot*

14 Hybrid structures and non-semiconductor systems

- EP-0267 **A. Richter**, P. Baars, U. Merkt: *Supercurrents in two-dimensional electron systems*
- EP-0530 **J. Eroms**, M. Tolkiehn, D. Weiss, U. Rössler, J. de Boeck and S. Borghs: *Chaotic motion and suppression of commensurability effects in an Andreev antidot billiard*
- EP-0319 **H. Takayanagi**, T. Akazaki, M. Kawamura, Y. Harada, J. Nitta: *Superconducting junctions using AlGaAs/GaAs heterostructures with high H_{c2} NbN electrodes*
- EP-0322 **J.S. Correa**, T.A. Eckhause, E.G. Gwinn and M. Thomas: *Temperature dependence of critical currents in Nb/InAs/Nb Josephson junction arrays*
- EP-0296 **S.G. Chung**: *Superconductor-insulator transition in a single Josephson junction*
- EP-0676 **D. Quirion**, F. Lefloch and M. Sanquer: *Transport and heating effect in proximity superconducting structures*
- EP-0242 **E. McCann**, G. Tkachov, and V.I. Fal'ko: *Magnon-assisted Andreev transport across ferromagnet-superconductor junctions*
- EP-0508 **M. Taki**, Y. Nakae, Y. Yamamoto, I. Ferdsteyn, K. Kindo, M. Hagiwara, H. Hori: *Spin polarization of a 2D-electron gas and the magnetization problem of nano-particles*
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- EP-0414 Yu.P. Monarkha, **S.S. Sokolov**, G.-Q. Hai and N. Studart: *Channel magnetotransport of surface electrons on superfluid helium*