

Joint Polish-Japanese Workshop Spintronics - from new materials to applications

Warsaw, 15-18 Nov., 2011



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The figure of Frederic Chopin was the red thread beyond the sightseeing program of the previous spintronic Polish-Japanese Joint Seminar, held in 2007, on the eve of the Chopin Year in Leszno near Chopin's birthplace, Żelazowa Wola.

In occasion of this Workshop, we will follow the footmarks of Maria Skłodowska-Curie, who, being born and raised in Warsaw, has been chosen as symbol for the 2011 UN International Year of Chemistry.



Organizers: Ministry of Science and Higher Education
Japan Science and Technology Agency

Co-chairs: Tomasz Dietl, Shinji Kuroda, Hideo Ohno, Maciej Sawicki

technical assistance: Bartłomiej Chojnacki, Beata Imińska, WIMA CONVENTION

Talks

allocated time:

26 min or 16 min plus 4 min discussion

Posters size (max):

155 cm (width) x 114 cm (height)

Sponsors:

Ministry of Science and Higher Education
Japan Science and Technology Agency

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Hotel:

Harenda, Warszawa, ul. Krakowskie Przedmieście 4/6

phone: +48 22 826 0071

Venue:

Pałac Staszica (Staszic Palace) Warszawa, Nowy Świat 72

Maria Skłodowska-Curie Hall (hall # 126, one floor above the ground, right back)

Tuesday, 15 Nov. 2011

08:30 – 09:15	Social breakfast, Hotel Harenda
09:30 – 12:30	Warsaw sightseeing
12:45 – 13:30	Lunch, Institute of Physics, Polish Academy of Sciences, al. Lotników 32/46
13:30 – 15:30	Posters, Visits to the labs - Institute of Physics, PAS

POSTERS:

- 1. Current-induced spin transfer torque in a Neel domain wall in the linear response theory** *P. Baláž, V. K. Dugaev, J. Barnaś*
- 2. Resonant linear and nonlinear frequency multiplication in in sub-micrometer Permalloy elliptical dots** *V. Bessonov, U. Guzowska, R. Gieniusz, A. Maziewski, H. Ulrichs, V.E. Demidov, S.O. Demokritov and S. Urazhdin*
- 3. The dependence of magnetization reversal of nanodots on their size and occurring defects** *E. Sieczkowska, A. Pietroutchik, L.T. Baczewski, Z. Kurant, A. Maziewski, A. Wawro*
- 4. Influence of interlayer exchange coupling on switching of CoFeB/MgO/CoFeB Pseudo Spin-Valves with perpendicular anisotropy** *M. Czapkiewicz, W. Skowroński, J. Wrona, T. Stobiecki, J. Dubowik, R. Saris and H.J.M. Swagten*
- 5. Exchange coupled NiFe/NiMn bilayers studied by vector network analyzer ferromagnetic resonance** *H. Głowiński, J. Dubowik*
- 6. In situ X-ray diffraction study of CoFeB/MgO/CoFeB based P-SV and EB-SV magnetic tunnel junctions** *J. Kanak, T. Stobiecki, W. Powroźnik, P. Wiśniowski, A. Załęski, J. Cao, S. Cardoso, P. Freitas*
- 7. Laser-induced magnetization precession in ultrathin cobalt films** *J. Kisielewski, A. Maziewski, A. Stupakiewicz, A. Kirilyuk, A. Kimel, Th. Rasing, L.T. Baczewski, A. Wawro*
- 8. Lattice of artificial magnetic domains in Au/Co/Au multilayers** *P. Kuświk, A. Ehresmann, M. Tekielak, B. Szymański, I. Sveklo, P. Mazalski, D. Engel, J. Kisielewski, D. Lengemann, M. Urbaniak, C. Schmidt, A. Maziewski, F. Stobiecki*
- 9. Co/Au multilayers with aimed coercive field gradient** *Bogdan Szymański, Michał Matczak, Daniel Lengemann, Piotr Kuświk, Arno Ehresmann, Feliks Stobiecki*
- 10. Magnetic properties of Fe-NiO bilayers grown on MgO(100)** *E. Młyńczak, P. Luches, A. Rota, S. Valeri, and J. Korecki*
- 11. Tunable magnetic properties of Fe/MgO superlattice** *A. Kozioł-Rachwał, K. Matlak, M. Ślęzak, T. Ślęzak, K. Freindl, N. Spiridis, D. Wilgocka-Ślęzak, M. Zajęc, J. Korecki*
- 12. Martensitic transformations in epitaxial Ni-Mn-Sn thin films** *K. Załęski and J. Dubowik*

13. Signature of Spin Triplet Pairing in $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3/\text{YBa}_2\text{Cu}_3\text{O}_7/\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ trilayers

K. Dybko, K. Werner-Malento, P. Aleshkevych, M. Wójcik, M. Sawicki and P. Przysławski

14. Zinc vacancy induced ferromagnetic interaction in semimagnetic semiconductor (Zn,Mn)Te

Van Khoi, K. Swiątek, M. Pawłowski and R. R. Gałzka

15. (Zn,Co)O films grown by Atomic Layer Deposition *M.I. Łukasiewicz, M. Godlewski, E.*

Guziewicz, B.S. Witkowski, A. Wittlin, M. Jaworski, W. Stefanowicz, M. Sawicki, R. Jakięła, A. Wołoś, Z. Wilamowski

16. Raman scattering as a perfect tool to determine the Co^{2+} - Co^{2+} exchange integral in ZnO *W.*

Szuskiewicz, J.F. Morhange, A. Łusakowski, M. Kanehisa, K. Gas and Z. Gołacki

17. Magnetic properties of ZnO nanocrystals incorporating Co *I. Kuryliszyn-Kudelska, B. Hadzic, N.*

Romcevic, M. Romcevic, D. Siberac, M. Arciszewska, U. Narkiewicz, W. Dobrowolski

18. Electron paramagnetic resonance of dilute transition metal ions in gallium nitride

A. Grois, A. Navarro-Quezada, N. Gonzalez Szwacki, W. Stefanowicz, T. Li, T. Devillers, M. Rovezzi, R. Jakięła, B. Faina, J. A. Majewski, M. Sawicki, T. E. Winkler, D. Sztenkiel, M. Wegscheider, W. Jantsch, J. Suffczyński, F. D'Acapito, A. Meingast, G. Kothleitner, T. Dietl and A. Bonanni

19. Magneto-optical properties of (Ga,Fe)N layers *J. Papierska, J.-G. Rousset, A. Golnik, W.*

Pacuski, M. Nawrocki, J. A. Gaj, J. Suffczyński, I. Kowalik, W. Stefanowicz, M. Sawicki, T. Dietl, A. Navarro-Quezada, B. Faina, Tian Li, A. Bonanni

20. On the growth of Mn doped GaN: Molecular beam epitaxy under different conditions

G. Kunert, C. Kruse, M. Sawicki, W. Stefanowicz, S. Dobkowska, T. Dietl, D. Hommel

21. GaAs/(Ga,Mn)As Core-Shell Nanowire Structures Grown by MBE on GaAs(111)B Substrates

A. Siusys, P. Dziawa, A. Reszka, B. J. Kowalski, J. Sadowski

22. Analysis of the magnetic anisotropy in ultrathin GaMnAs *O. Proselkov, W. Stefanowicz, S.*

Dobkowska, J. Sadowski, T. Dietl, M. Sawicki

23. Magnetic Properties of (Ga,Mn)As near Metal-Insulator Transition *S. Dobkowska, W.*

Stefanowicz, O. Proselkov, R. Žuberek, J. Sadowski, T. Dietl, and M. Sawicki

Additional posters will show **“New equipment in the Institute of Physics, PAS”**

15:30 – 16:15

Andrzej Kajetan Wróblewski

The greatness of Maria Skłodowska-Curie

Main Hall, Institute of Physics, Polish Academy of Sciences

16:15 – 17:15

Reception, Institute of Physics, Polish Academy of Sciences,

17:15 –

Transfer to Harena by bus

19:00 – 21:00

**Concert at Filharmonia Narodowa, Chamber Hall,
Moniuszki 5 St. (by foot from Harena)**

Wednesday, 16 Nov. 2011

09:00 – 09:20

Welcome Addresses:

Maciej Banach (Ministry of Science and Higher Education)
Mamoru Shinohara (Japan Science and Technology Agency)
Jacek Kossut (Institute of Physics, Polish Academy of Sciences)

Session I

Chair: Hiroshi Katayama-Yoshida

09:20 – 09:50

Silicon quantum computing using electron spins, ^{31}P nuclear spins, and ^{29}Si nuclear spins as qubits

Kohei Itoh, *Dept. Applied Physics, Keio University, Yokohama*

09:50 – 10:10

Decoherence in a sparse system of dipolarly coupled spins: application to isotope-enriched silicon

Łukasz Cywiński, *Institute of Physics, Polish Academy of Sciences, Warsaw*

10:10 – 10:30

Growth of optically active diluted magnetic ZnMnTe/ZnMgTe core/shell nanowires

Piotr Wojnar, *Institute of Physics, Polish Academy of Sciences, Warsaw*

10:30 - 10:50

Universality of the Kondo effect in quantum dots with ferromagnetic leads

Ireneusz Weymann, *Department of Physics, Adam Mickiewicz University, Poznań*

10:50 – 11:10

coffee break

Session II (Wednesday)

Chair: Shinji Kuroda

11:10 – 11:40

Electric-field Effect on Thin Ferromagnetic Layers

Fumihiko Matsukura, *Center for Spintronics Integrated Systems, Tohoku University; Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University*

11:40 - 12:00

Magneto-resistive memory in cross-like (Ga,Mn)As nanostructures

Tadeusz Wosiński, *Institute of Physics, Polish Academy of Sciences, Warsaw*

12:00 - 12:20

Origin of uniaxial magnetic anisotropy in (Ga,Mn)As

Jacek A. Majewski, *Faculty of Physics, University of Warsaw*

12:20 - 12:40 **Control of magnetic interactions in (Ga,Mn)N through codoping**
Thibaut Devillers, *Institut für Halbleiter und Festkörperphysik, Johannes Kepler Universität, Linz*

12:40 - 13:00 **A bulk look to (Ga,Mn)N electronic structure: the resonant hard x-ray emission spectroscopy approach**
Mauro Rovezzi, *European Synchrotron Radiation Facility, Grenoble*

13:00 – 14:00 **Lunch**

Session III (Wednesday)

Chair: Kohei Itoh

14:00 – 14:30 **Structural and compositional phase separation in ferromagnetic semiconductor (Zn,Cr)Te**
Shinji Kuroda, *Institute of Materials Science, University of Tsukuba*

14:30 - 14:50 **Properties of transition metal pairs at the surface of GaN and GaN:Si,Mg**
Nevill Gonzalez Szwacki, *Faculty of Physics, University of Warsaw*

14:50 - 15:10 **The key role of growth mode on Mg-codoped (Ga,Fe)N**
Andrea Navarro-Quezada, *Institut für Halbleiter-und-Festkörperphysik, Johannes Kepler University, Linz*

15:10 - 15:30 **Soft x-ray spectroscopy and microscopy on (Ga,Fe)N films**
Iwona Kowalik, *Institute of Physics, Polish Academy of Sciences, Warsaw*

15:30 – 16:00 **coffee break**

Session IV (Wednesday)

Chair: Alberta Bonanni

16:00 – 16:30 **MCD spectra of diluted magnetic semiconductors at L-critical point**
Koji Ando, *Nanoelectronics Research Institute, AIST, Tsukuba*

16:30 - 16:50 **sp-d exchange coupling in Mn doped GaN and ZnO studied by magnetospectroscopy**
Jan Suffczyński, *Institute of Experimental Physics, Faculty of Physics, University of Warsaw, Poland*

16:50 - 17:10 **Structure-Dependent Ferromagnetism in Mn-Doped III-V Nanowires**
Ryszard Buczko, *Institute of Physics, Polish Academy of Sciences, Warsaw*

17:10 - 17:30 **Segregation of MnAs nanocrystals in annealed GaMnAs layers and superlattices**
Janusz Sadowski, *MAX-Lab, Lund University*

- 17:30 - 17:50** **Ferromagnetic transition induced by laser and electron beam re-crystallization of (Ge,Mn)Te layers**
Tomasz Story, Institute of Physics, Polish Academy of Sciences, Warsaw
- 19:30 – 22:30** **Workshop Dinner, Villa Foksal restaurant, Foksal 3/5 St. (by foot)**

Thursday, 17 Nov. 2011

Session V

Chair: Gerrit Bauer

- 09:00 – 09:30** **Valence-band structure of (III,Mn)As ferromagnetic semiconductors**
Shinobu Ohya, Dept. of Electrical Eng. and Information Systems, The University of Tokyo
- 09:30 - 09:50** **A Zener-model explanation of the experimental data for the specific heat, thermopower and resonant tunnelling in (Ga,Mn)As**
Cezary Śliwa, Institute of Physics, Polish Academy of Sciences, Warsaw
- 09:50 - 10:10** **Hydrostatic pressure study of paramagnetic-ferromagnetic phase transition in (Ga,Mn)As**
Marta Gryglas-Borysiewicz, Institute of Experimental Physics, Faculty of Physics, University of Warsaw, Poland
- 10:10 - 10:30** **The structure and magnetic properties of nanoclusters in GaMnAs matrix studied by XAS and XMCD**
Krystyna Ławniczak-Jabłonska, Institute of Physics, Polish Academy of Sciences, Warsaw
- 10:30 - 10:50** **Magnetoresistance of nanocomposite II-IV-V₂ ferromagnetic semiconductors**
Łukasz Kilański, Institute of Physics, Polish Academy of Sciences, Warsaw
- 10:50 – 11:10** ***coffee break***

Session VI (Thursday)

Chair: Koji Ando

- 11:10 – 11:40** **Spin caloritronics: more than spin-dependent thermoelectrics**
Gerrit E.W. Bauer, Institute of Materials Research, Tohoku University & Kavli Institute of NanoScience, TU Delft
- 11:40 - 12:00** **Charge and spin thermoelectric properties of double quantum dots coupled to magnetic leads**
Józef Barnaś, Department of Physics, Adam Mickiewicz University, Poznań; Institute of Molecular Physics, Polish Academy of Sciences, Poznań

12:00 - 12:30 **Computational Nano-Materials Design for Semiconductor Nanospintronics: Spinodal Nano-decomposition, Codoping, and New Materials**
Hiroshi Katayama-Yoshida, *Graduate School of Engineering Science, Osaka University*

12:30 - 13:00 **Incorporation and magnetism of transition metals in GaN: experiment vs. theory**
Alberta Bonanni, *Institut für Halbleiter-und-Festkörperphysik, Johannes Kepler University, Linz*

13:00 – 14:00 **Lunch**

Session VII (Thursday)

Chair: Hideo Ohno

14:00 – 14:30 **Spin-Motive Force in Magnetic Nanostructures**
Sadamichi Maekawa, *Advanced Science Research Center, Atomic Energy Agency; CREST, Japan Science and Technology Agency, Tokyo*

14:30 - 14:50 **Colossal negative magnetoresistance and conductance bistability in magnetic semiconductors**
Tomasz Dietl, *Laboratory for Cryogenic and Spintronic Research, Institute of Physics, Polish Academy of Sciences, Warsaw; Institute of Theoretical Physics, University of Warsaw*

14:50 - 15:10 **XPS studies of (Zn,Co)O/Si interfaces**
Elżbieta Guzewicz, *Institute of Physics Polish Academy of Science, Warsaw*

15:10 - 15:30 **Heterogeneous Magnetism in (Zn,Co)O**
Maciej Sawicki, *Institute of Physics Polish Academy of Science, Warsaw*

15:30 – 16:00 **coffee break**

Session VIII (Thursday)

Chair: Eiji Saitoh

16:00 – 16:30 **Electric field induced dynamic magnetization switching in FeCo ultrathin films at room temperature**
Yoshishige Suzuki, *Graduate School of Engineering Science, Osaka University, CREST, Japan Science and Technology Agency*

16:30 - 16:50 **Microwave emission from spin torque oscillators based on asymmetric magnetic tunnel junctions**
Tomasz Stobiecki, *Department of Electronics, AGH University of Science and Technology, Kraków*

16:50 - 17:10 **Ultrathin Co layers with artificially modified magnetic anisotropy - magnetization reversal and applications**
Maciej Urbaniak, *Institute of Molecular Physics, Polish Academy of Sciences, Poznań*

- 17:10 - 17:30** **Tunable magnetic properties in ultrathin Co films on vicinal substrates**
A. Stupakiewicz, Laboratory of Magnetism, Faculty of Physics, University of Białystok
- 18:30 – 20:00** **Reception in the Residence of the Embassy of Japan in Warsaw, Kawalerii 3 St.** (transport by bus; by invitation)

Friday, 18 Nov. 2011

Session IX

Chair: Teruo Ono

- 09:00 – 09:30** **Spintronics devices using newly developed Co₂Fe(Ga_{0.5}Ge_{0.5}) alloy**
Yukiko Takahashi, Magnetic Materials Unit, National Institute for Materials Science, Tsukuba
- 09:30 - 09:50** **Electron Doping in Co₂FeAl_{1-x}Si_x Heusker Alloys Revealed by ⁵⁹Co NMR Experiment**
Marek Wójcik, Institute of Physics, Polish Academy of Sciences, Warsaw
- 09:50 - 10:10** **Magnetization dynamics in epitaxial Ni₂MnSn Heusler compound films**
Janusz Dubowik, Institute of Molecular Physics, Polish Academy of Sciences, Poznań
- 10:10 - 10:30** **Magnetic nanodots forced in an ultrathin Co film by a structured buffer**
Andrzej Wawro, Institute of Physics, Polish Academy of Sciences, Warsaw
- 10:30 - 10:50** **Tunable magnetic properties of cobaltite nanoparticles**
A. Wiśniewski, Institute of Physics, Polish Academy of Sciences, Warsaw

10:50 – 11:20 ***coffee break***

Session X (Friday)

Chair: Yukiko Takahashi

- 11:20 – 11:50** **Spin current generation using heat and magnetic dynamics**
Eiji Saitoh, Institute for Materials Research, Tohoku University, Sendai; The Advanced Science Research Center, Japan Atomic Energy Agency
- 11:50 - 12:10** **Garnets – selected problems of magnetization dynamics.**
Andrzej Maziewski, Laboratory of Magnetism, Faculty of Physics, University of Białystok

12:10 - 12:40 **Magnetic tunnel junctions with perpendicular anisotropy for high-density spin-torque MRAM**
Shinji Yuasa, National Institute of Advanced Industrial Science and Technology, Tsukuba

12:40 - 13:00 **Are simple oxides useful for spintronics?**
Józef Korecki, Faculty of Physics and Applied Computer Science, AGH-UST, Kraków; Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, Kraków

13:00 – 14:00 **Lunch**

Session XI (Friday)

Chair: Yoshishige Suzuki

14:00 – 14:20 **High mobility CdTe- and Cd_{1-x}Mn_xTe-based 2DEG nanostructures: from technology to applications in basic research and applied science**
T. Wojtowicz, Institute of Physics, Polish Academy of Sciences, Warsaw

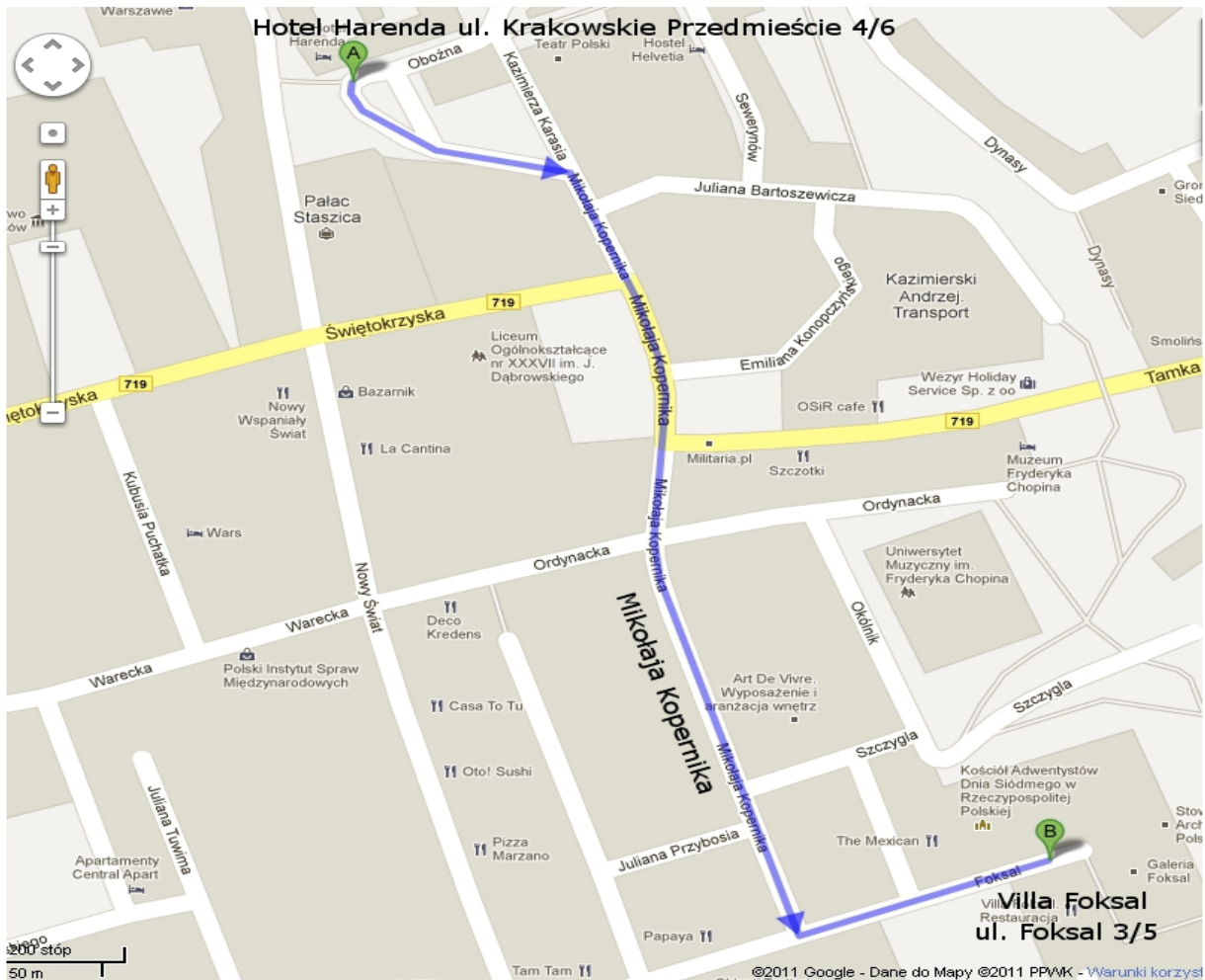
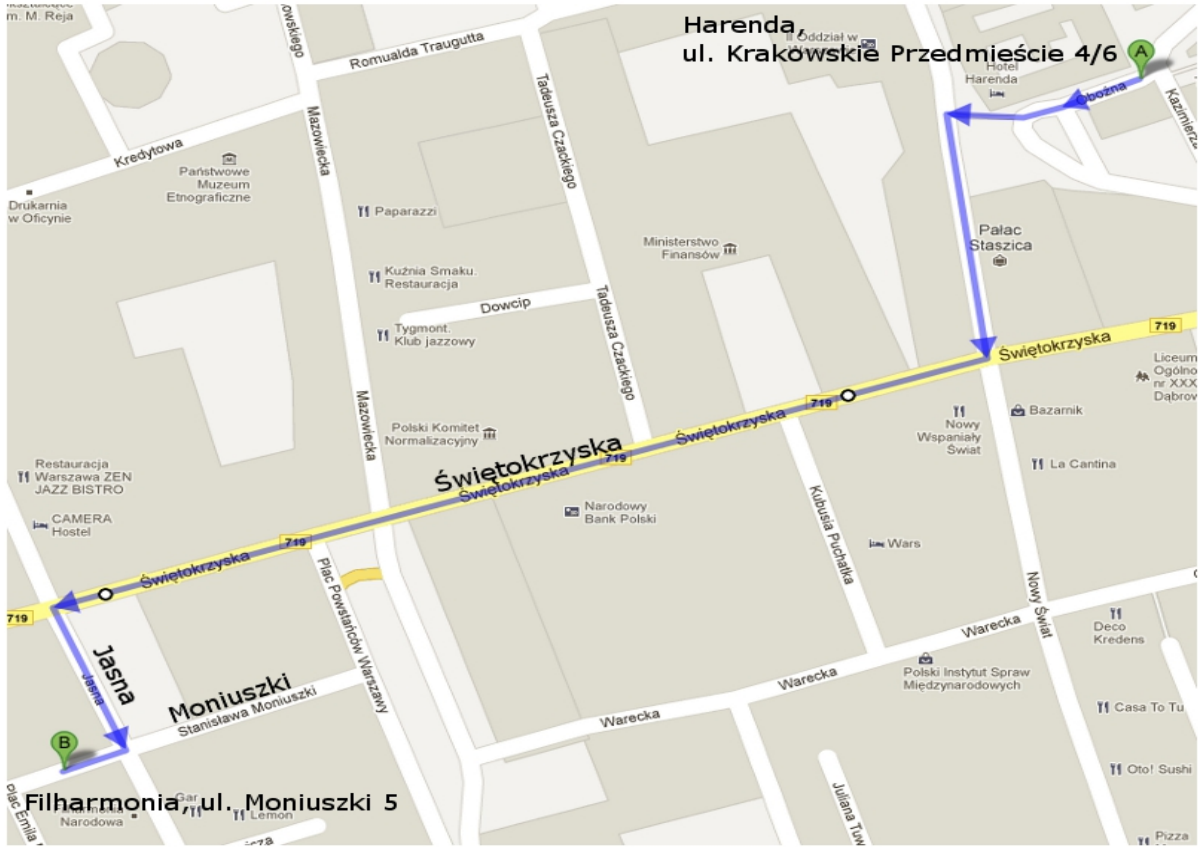
14:20 - 14:40 **Optical manipulation of a single Mn spin in a CdTe-based quantum dot**
P. Kossacki, Institute of Experimental Physics, University of Warsaw; Grenoble High Magnetic Field Laboratory, CNRS

14:40 - 15:10 **Current-induced domain wall motion and its application**
Teruo Ono, Institute for Chemical Research, Kyoto University

15:10 - 15:40 **Spintronic-based Nonvolatile CMOS VLSI**
Hideo Ohno, Center for Spintronics Integrated Systems, Tohoku University, Sendai; Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, Sendai

15:40 – 16:40 **Sadamichi Maekawa**
Wrap up and outlook
Discussion over coffee

The suggested passage from hotel Harenda to Filharmonia Narodowa for Tuesday evening concert



The way from Pałac Staszica to Villa Foksal for Workshop Dinner on Wednesday evening

Nov. 15th Tuesday 08:30 – 21:00

08:30 – 09:15	<i>Social breakfast Hotel Harenda</i>
09:30 – 12:30	Warsaw Sightseeing
12:45 – 13:30	<i>Lunch, Institute of Physics PAS, al. Lotników 32/46</i>
13:30 – 15:30	<i>Posters, IoP PAS Visits to the labs</i>
15:30 – 16:15	Andrzej Kajetan Wróblewski <i>„The greatness of Maria Skłodowska- Curie” IoP PAS</i>
16:15 – 17:15	<i>Reception, IoP PAS</i>
17:15 –	<i>Transfer to Harenda</i>
19:00 – 21:00	Concert in Filharmonia Narodowa, ul. Moniuszki 5

**Nov. 16th Wednesday 09:00 – 22:30
Staszic Palace, hall # 126**

09:00 – 09:20	Welcome Addresses
chair	H. Katayama-Yoshida
09:20 – 09:50	Kohei Itoh
09:50 – 10:10	Łukasz Cywiński
10:10 – 10:30	Piotr Wojnar
10:30 – 10:50	Irenuesz Weymann
10:50 – 11:10	<i>Break/S. Kuroda</i>
11:10 – 11:40	Fumihiko Matsukura
11:40 – 12:00	Tadeusz Wosiński
12:00 – 12:20	Jacek Majewski
12:20 – 12:40	Thibaut Devillers
12:40 – 13:00	Mauro Rovezzi
13:00 – 14:00	<i>Lunch/K. Itoh</i>
14:00 – 14:30	Shinji Kuroda
14:30 – 14:50	Nevill Gonzalez Szwacki
14:50 – 15:10	Andrea Navarro- Quezada
15:10 – 15:30	Iwona Kowalik
15:30 – 16:00	<i>Break/ A. Bonanni</i>
16:00 – 16:30	Koji Ando
16:30 – 16:50	Jan Suffczyński
16:50 – 17:10	Ryszard Buczko
17:10 – 17:30	Janusz Sadowski
17:30 – 17:50	Tomasz Story
19:30 – 22:30	Workshop Dinner Villa Foksal restaurant ul. Foksal 3/5

**Nov. 17th Thursday 09:00 – 20:00
Staszic Palace, hall # 126**

chair	G. Bauer
09:00 – 09:30	Shinobu Ohya
09:30 – 09:50	Cezary Śliwa
09:50 – 10:10	Marta Gryglas- Borysiewicz
10:10 – 10:30	Krystyna Jabłońska
10:30 – 10:50	Łukasz Kilański
10:50 – 11:10	<i>Break/K. Ando</i>
11:10 – 11:40	Gerrit Bauer
11:40 – 12:00	Józef Barnaś
12:00 – 12:30	Hiroshi Katayama- Yoshida
12:30 – 13:00	Alberta Bonanni
13:00 – 14:00	<i>Lunch/H. Ohno</i>
14:00 – 14:30	Sadamichi Maekawa
14:30 – 14:50	Tomasz Dietl
14:50 – 15:10	Elżbieta Guzewicz
15:10 – 15:30	Maciej Sawicki
15:30 – 16:00	<i>Break/E. Saitoh</i>
16:00 – 16:30	Yoshishige Suzuki
16:30 – 16:50	Tomasz Stobiecki
16:50 – 17:10	Maciej Urbaniak
17:10 – 17:30	Andrzej Stupakiewicz
18:30 – 20:00	<i>Reception in the Residence of the Embassy of Japan in Warsaw, by invitation</i>

**Nov. 18th Friday 09:00 – 16:40
Staszic Palace, hall # 126**

chair	T. Ono
09:00 – 09:30	Yukiko Takahashi
09:30 – 09:50	Marek Wójcik
09:50 – 10:10	Janusz Dubowik
10:10 – 10:30	Andrzej Wawro
10:30 – 10:50	Andrzej Wiśniewski
10:50 – 11:20	<i>Break/Y. Takahashi</i>
11:20 – 11:50	Eiji Saitoh
11:50 – 12:10	Andrzej Maziewski
12:10 – 12:40	Shinji Yuasa
12:40 – 13:00	Józef Korecki
13:00 – 14:00	<i>Lunch/Y. Suzuki</i>
14:00 – 14:20	Tomasz Wojtowicz
14:20 – 14:40	Piotr Kossacki
14:40 – 15:10	Teruo Ono
15:10 – 15:40	Hideo Ohno
15:40 – 16:40	Sadamichi Maekawa Wrap up and outlook Discussion over coffee