

WILHELM UND ELSE HERAEUS-STIFTUNG



378th WE-Heraeus-Seminar

Spin Torque in Magnetic Nanostructures

**23 – 26 October 2006
Physikzentrum Bad Honnef (Germany)**

Sunday, 22 October 2006

from 17:00 Arrival at the Physikzentrum Bad Honnef, Registration

from 18:00 Buffet Supper

Monday, 23 October 2006 (morning)

08:00 BREAKFAST

09:45 **Welcome and Opening**
Ulrich Eckern (Augsburg)

10:00 **Spin-transfer torque effects in single-crystalline nanopillars
and nanomagnets**
Daniel E. Bürgler (Jülich)

10:45 Discussion

11:00 COFFEE BREAK

11:30 **Manipulation of magnetization and domain walls by non-local
spin injection**
Takashi Kimura (Tokyo)

12:00 Discussion

12:15 **Spin-mixing effects on magnetic switching, probed by ther-
moelectric measurements**
Jean-Philippe Ansermet (Lausanne)

12:45 Discussion

13:00 LUNCH

Monday, 23 October 2006 (afternoon)

- 14:30 **Ferromagnetic relaxation due to spin pumping**
Georg Woltersdorf (Regensburg)
- 15:00 Discussion
- 15:15 **Excitation of spin-structure in nano-magnet by electrical current**
Teruo Ono (Kyoto)
- 15:45 Discussion
- 16:00 COFFEE BREAK
- 16:30 **Geometric spin dephasing in quantum dots**
Gergely Zarand (Budapest)
- 17:00 Discussion
- 17:15 **Spin torque in quantum-dot spin valves**
Jürgen König (Bochum)
- 17:45 Discussion
- 18:00 **The Wilhelm and Else Heraeus Foundation**
Ernst Dreisigacker (Hanau)
- 19:00 DINNER
- Followed by a social evening at the invitation of the Wilhelm and Else Heraeus-Stiftung in the "Bürgerstube" at the Physikzentrum

Tuesday, 24 October 2006 (morning)

- 08:00 BREAKFAST
- 09:00 **Role of quantum interference in ferromagnetic thin films**
Shreekantha Sil (Visva-Bharati)
- 09:30 Discussion
- 09:45 **Spin torque in mesoscopic systems**
Jun-ichiro Ohe (Hamburg)
- 10:15 Discussion
- 10:30 COFFEE BREAK
- 11:00 **Microstructure of magnetic domain walls upon current injection**
Rolf Allenspach (Zurich)
- 11:30 Discussion
- 11:45 **Interactions between spin polarized currents and domain walls**
Mathias Kläui (Konstanz)
- 12:15 Discussion
- 12:30 LUNCH

Tuesday, 24 October 2006 (afternoon)

- 14:00 **Domain walls in magnetic nanowires**
Russell P. Cowburn (London)
- 14:30 Discussion
- 14:45 **Spin Transfer torque studies using focused-ion-beam as-**
sisted nanostencil mask fabrication
Gernot Güntherodt (Aachen)
- 15:15 Discussion
- 15:30 COFFEE BREAK
- 16:00 **Quasiclassical approach to spin Hall effect in 2DEG**
Roberto Raimondi (Rome)
- 16:30 Discussion
- 16:45 **Poster Session / Micro-Seminars**
3 minutes, 2 transparencies for each poster!
- 18:30 DINNER
- 19:30 **Poster Session**

Wednesday, 25 October 2006

- 08:00 BREAKFAST
- 09:00 **Magnetic racetrack memory: field and current induced motion of domain walls**
Stuart S. P. Parkin (San Jose)
- 09:45 Discussion
- 10:00 **Hysteresis and mode hopping in symmetrical spin valves**
Jacques Miltat (Orsay)
- 10:30 Discussion
- 10:45 COFFEE BREAK
- 11:15 **Theory of current-driven domain wall dynamics**
Gen Tatara (Tokyo)
- 11:45 Discussion
- 12:00 **Current assisted switching of magnetic tunnelling cells with MgO barriers and different area resistance products**
Günter Reiss (Bielefeld)
- 12:30 Discussion
- 12:45 LUNCH
- 14:00 **EXCURSION**
- 18:00 DINNER
- 19:00 **Spin waves in magnetic nanostructures**
Burkard Hillebrands (Kaiserslautern)
- 19:45 Discussion
- 20:00 **Berry phase, topology, and diabolicity in molecular magnets**
Patrick Bruno (Halle)
- 20:45 Discussion

Thursday, 26 October 2006 (morning)

- 08:00 BREAKFAST
- 09:00 **Spin transfer: from switching to high frequency oscillations and synchronization of spin transfer oscillators**
Albert Fert (Orsay)
- 09:45 Discussion
- 10:00 **Current induced magnetic switching and magnetic dynamics in spin valves**
Jozef Barnas (Poznan)
- 10:30 Discussion
- 10:45 COFFEE BREAK
- 11:15 **Oscillatory behavior of the linewidth with respect to the spacer thickness in the ferromagnetic resonance of trilayers**
Kilian Lenz (Berlin)
- 11:45 Discussion
- 12:00 **Inducing domain walls by spatial modulation of exchange bias**
Chris van Haesendonck (Leuven)
- 12:30 Discussion
- 12:45 LUNCH

Thursday, 26 October 2006 (afternoon)

14:00 **First principles theory of spin-transfer torque and its connection to previous model calculations**
George Mathon (London)

14:30 Discussion

14:45 **A simple vision of spin torques in domain walls**
Michel Viret (Saclay)

15:15 Discussion

15:30 **Conference Summary**

15:45 COFFEE

DEPARTURE

Poster Contributions

- D. Bedau
(Konstanz) Geometrically confined domain walls
- B. Beschoten,
N. Müsgens
(Aachen) Spin transfer torque studies using focus-ion-beam assisted nanostencil mask fabrication
- M. Bolte,
A. Drews
(Hamburg) Current-induced magnetic vortex oscillations observed by time-resolved e-ray microscopy
- M. Braun
(Bochum) Conductance and current noise of a quantum dot spin valve
- T. Dimopoulos,
H. Brückl
(Vienna) Magnetic and transport properties of embedded magnetic cells for a front-end MRAM architecture
- C. Gorini et al.
(Augsburg) Spin relaxation in narrow wires of a two-dimensional electron gas
- J. Hamrle
(Kaiserslautern) Magnetic properties of $\text{Co}_2\text{Cr}_{0.6}\text{Fe}_{0.4}\text{Al}$ and Co_2FeSi
- C. Hassel
(Duisburg) Resistance of a single domain wall in $(\text{Co}/\text{Pt})_n$ -multilayer-nanowires
- H. Herper
(Duisburg) Domain walls in systems with large magneto-crystalline anisotropy
- L. Heyne
(Konstanz) Current-assisted domain wall propagation at variable temperature
- B. Krüger
(Hamburg) Current-driven domain wall dynamics in curved nanowires
- Y. Luo
(Göttingen) Spin transfer torque effect in granular film AgCo and spin-valve structure $\text{CoFeNiSiB}/\text{Cu}/\text{Co}$

Poster Contributions

- S. Mangin et al.
(Vandoeuvre) Current-induced magnetization reversal in nanopillars with perpendicular anisotropy
- G. Meier
(Hamburg) Vortex-domain wall motion and deformation by ns-current pulses observed by magnetic transmission x-ray microscopy
- K. Obata
(Tokyo) Spin transport in the Rashba system
- A. Rinkevich
et al.
(Ekaterinburg) Microwave penetration and magnetic resonance in Fe/Cr nanostructures with ultrathin layers
- L. San Emeterio
Alvarez
(Leeds) Nucleation and propagation of domain walls in a perpendicularly magnetised nanowire
- S. Schenk,
G. Ingold
(Augsburg) Phase space description of correlated spin systems
- H. Schultheiß
(Kaiserslautern) Observation of partial decoherence of quantized spin waves in nanoscaled magnetic ring structures
- M. Stamenova
(Dublin) Time-dependent simulation of current-induced domain wall dynamics in magnetic atomic wires
- M. Thorwart
(Düsseldorf) Spin torque and domain wall motion in current-carrying ferromagnets with spin relaxation
- A. Vanhaverbeke
(Rüschlikon) Domain wall current-induced motion in magnetic nanowires imaged by spin-polarized scanning electron microscopy

Best Poster Award:

Markus Bolte
Stephane Mangin
Maria Stamenova