

# AGENDA

## **NANOSPIN PSPB-045/2010**

### **Nanoscale spin torque devices for spin electronics**

**Summarizing MEETING, 11th-12th of July 2016**

# 20 year Anniversary of Spin Torque

Letter to the editor Journal of Magnetism and Magnetic Materials

Vol. 159, **June 1996**, Pages L1-L7

Current-driven excitation of magnetic multilayers

J.C. Slonczewski \*, slon@watson.ibm.com

Phys. Rev. B 54, 9353 – **1 October 1996**

L. Berger

Emission of spin waves by a magnetic multilayer traversed by a current

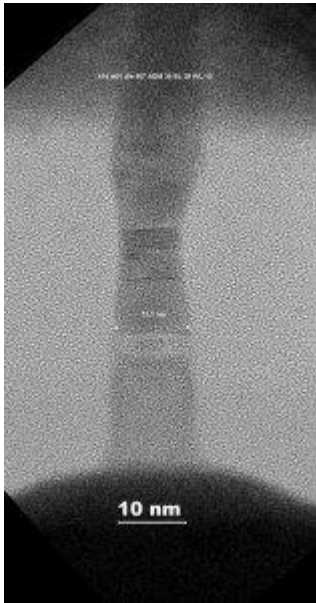
IBM demonstrated 11nm STT-MRAM junction, says "time for STT-MRAM is now"

Posted: 07 Jul 2016 09:08 PM PDT

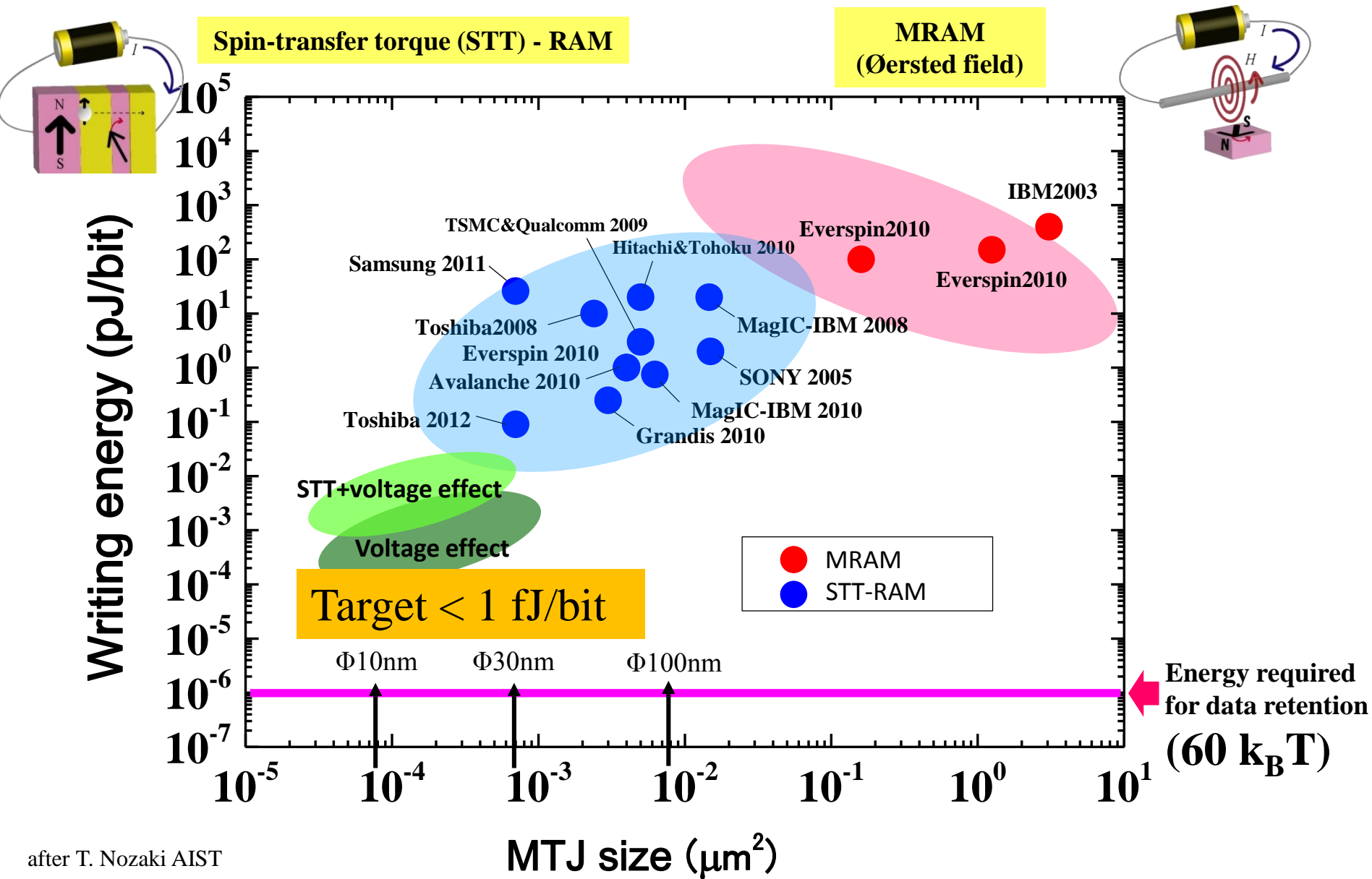
IBM in collaboration with Samsung, demonstrated switching MRAM cells for devices with diameters ranging from **50 down to 11 nanometers** in only 10 nanoseconds, using only 7.5 microamperes. The researchers say that this is a significant achievement on the way to high-density low-power STT-MRAM.

Using perpendicular magnetic anisotropy (PMA), the researchers can deliver good STT-MRAM performance down to  $7 \times 10^{-10}$  write-error-rate with 10 nanosecond pulses using switching currents of only 7.5 microampere.

**IBM is quite excited** about this new achievement, and the company says that the "time for Spin Torque MRAM is now". This coincides with the fact that twenty years ago, **IBM scientist John Slonczewski invented the STT-MRAM and published this in a now seminal paper "Current-driven excitation of magnetic multilayers" in JMMM** IBM will host a special STT-MRAM symposium on November 7

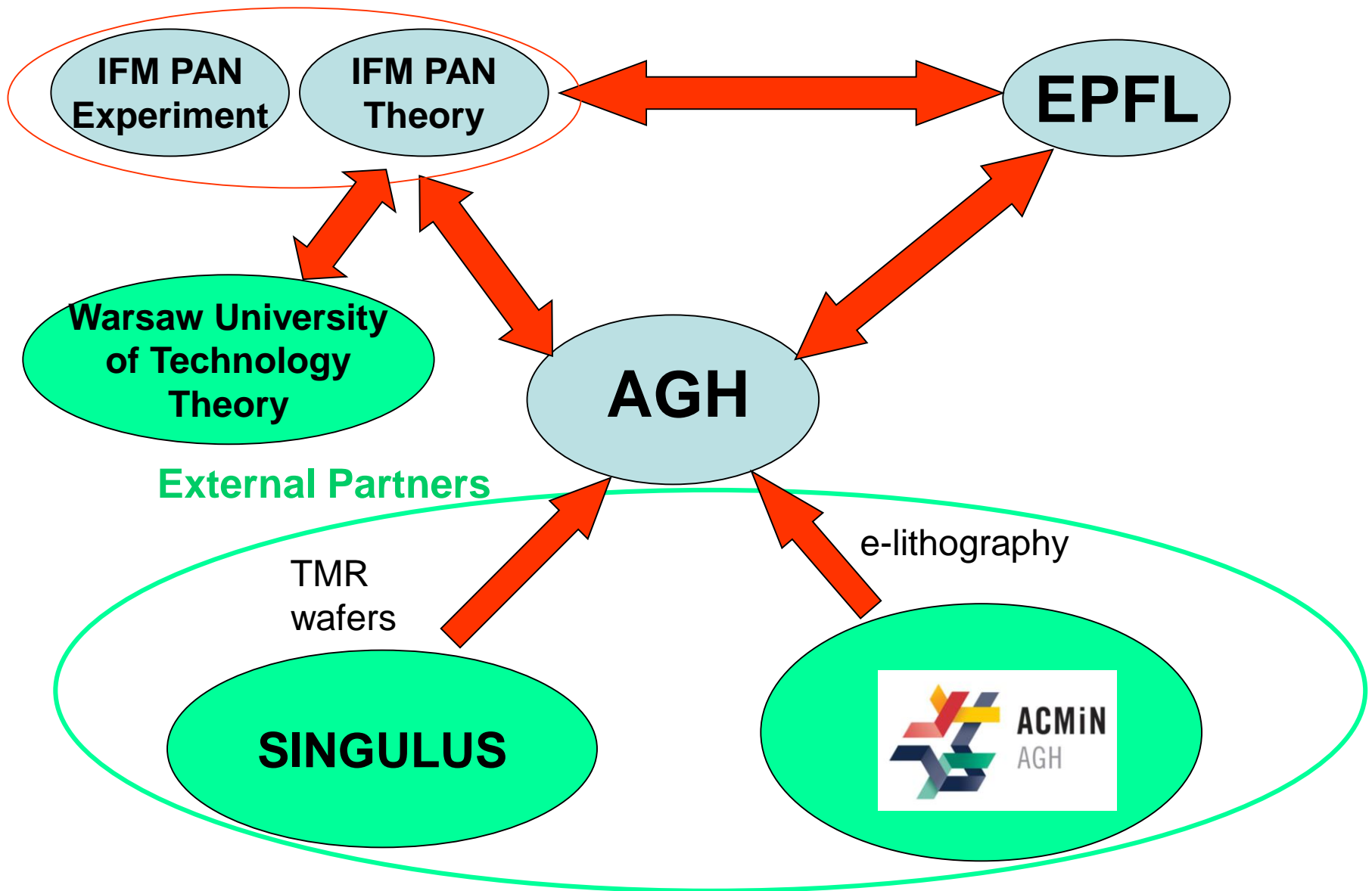


# GREEN IT, Present status of writing energy for MRAM



after T. Nozaki AIST

# Cooperation of NANOSPIN





# July 11 (Monday)

**9.00**

Tomasz Stobiecki

**Welcome and introductory remarks**

Presentations of NANOSPIN contributions (each 45 min including discussion):

**9.15**

Adam Krysztofik, Hubert Głowiński, Janusz Dubowik

*IFM PAN Institute of Molecular Physics Polish Academy of Sciences*

**Magnetic insulator YIG films – preparation, magnetic static and dynamic properties, devices**

**10.00**

Hubert Głowiński, Adam Krysztofik, Janusz Dubowik

*IFM PAN Institute of Molecular Physics Polish Academy of Sciences*

**Spin pumping and tuning of magnetization damping by spin Hall currents**

**10.45 – 11.15**

**Coffee break**



**11.15**

Monika Cecot, Witold Skowroński, Tomasz Stobiecki

*AGH University of Science and Technology*

**Temperature dependency of Spin Hall Effect in Ta/CoFeB systems**

**12.00**

Józef Barnaś, Anna Dyrdał, Łukasz Karwacki

*Adam Mickiewicz University in Poznań, Institute of Molecular Physics Polish Academy of Sciences*

**Theory of Spin Hall Effect and interface Spin-Orbit Coupling**

**12.45**

**Lunch**

**14.00**[Pavel Balaž](#), Jean-Philippe Ansermet, Józef Barnaś*Charles University in Prague***Measurement of spin penetration length using second harmonic voltage response**

and recent research at Charles University in Prague

[Pavel Balaž](#)**Ultrafast spin transfer torque generated by a femtosecond laser pulse****Magnetization processes in 3D topological insulators doped by magnetic atoms****14.45**[Jean-Philippe Ansermet](#)*EPFL***Heat-driven spin transfer torque in metals and in insulators****15.30**[Łukasz Frąckowiak](#)*Institute of Molecular Physics Polish Academy of Sciences***Structure of artificial ICE SPIN****16.15 – 16.45****Coffee break**





**16.45**

[Filip Lisiecki](#)

*Institute of Molecular Physics Polish Academy of Sciences*

**Magnetic dynamics of periodic and quasiperiodic arrays of magnonics NiFe stripes**

**17.30**

[Piotr Wiśniowski, Michał Dąbek](#)

*AGH University of Science and Technology*

**Tunneling magnetoresistance devices with MgO barrier and CoFeB electrodes for magnetic field sensors**

**19.00**

**Dinner – Dynia Resto Bar**



# July 12 (Tuesday) Magnetization dynamics

**9.15**

[Piotr Ogrodnik](#)

*Institute of Molecular Physics Polish Academy of Sciences, Warsaw University of Technology*

**Theory of Spin Diode effect**

**10.00**

[Marek Frankowski, Jakub Chęciński](#)

*AGH University of Science and Technology*

**Micromagnetic simulations of Spin Diode Effect**

**10.45 – 11.15**

**Coffee break**



**11.15**

[Mateusz Zelent](#)

*Adam Mickiewicz University in Poznań*

**Static and dynamic properties and sample applications of periodically perforated magnonic crystals**

**12.00**

[Sławomir Ziętek](#)

*AGH University of Science and Technology*

**FMR and spin waves in multiferroics**

**12.45**

[Tomasz Stobiecki](#)

**Achievements of Nanospin project, concluding remarks and discussion about future cooperation.**

**13.00**

**Lunch closing the meeting**