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EUROFLUX2009: FROM DEVICES TO CIRCUITS AND SYSTEMS

Avignon, France, September 21-23, 2009

by Denis Crété

THALES Research & Technology France

>> The aim of the second International Conference on Superconductive Electronics, organized within the S-PULSE Support Action of the European Community, is to disseminate the knowledge to interested industry and research laboratories in three principal sub-domains: digital electronics, superconducting sensors and microwave devices and systems.

The conference was organised by THALES, and hosted by the Université d'Avignon et des Pays du Vaucluse, Avignon, France. Dr. Denis Crété and Pr. Georges Waysand were responsible for the scientific program. The conference attracted nearly 60 attendees essentially from Europe and Russian Federation but also from Australia, India, Japan and South Africa. The 43 contributions included 7 invited talks, 22 oral contributions and 14 posters. Each of the invited talk was given 45mn; contributed talks (22) were 25 mn long.

T. Skotnicki (ST Microelectronics) opened the first session by giving an industrial view on semiconductor perspectives, comparing the frequency limit of various technologies. Then, V. Lacquaniti (INRIM Torino) presented the Nb/Al-AlOx/Nb process for Josephson junction (JJ) fabrication with an on-wafer spread of 4%. E. Tarte reported on Nb/Co/AlOx/Nb π-junctions for Qubit applications. T. Ortlepp has measured a deviation of about 7% with the usual current-phase relationship $I=Ic \sin\varphi$. J. Lesueur introduced a new process for damaged high critical temperature (HTc) nano-JJ with high IcRn products. G. Gol'tsman (Moscow St. Ped. Univ.) opened the session on radiation sensors by reviewing NbN hot electron bolometers with ultimate performance, and single photon detector with photon counting capability. Y. Divin presented a Hilbert spectrometer based on HTc JJ. I. Kawayama measured the optical response of Josephson vortex-flow transistor. N. Curz presented FIB technology on YBCO nanowires. L. Lolli reported on photon resolving Ti/Au or Ti-Pd TESs. V. Koshelets has developed integrated SIS receivers for balloon-borne instruments (T_{DSB}=120 K over 450-650 GHz). J. Kohlmann (PTB Braunschweig) made a survey of the technologies developed for the voltage standard. N. Yoshikawa (Yokohama Nat. Univ.) presented the new 10kA/cm² technology for high performance computing. P. Desgreys reported on the design of an I/Q mixer for band-pass Σ-Δ ADC. A. Andreski introduced the π-loop as basis for logic gates. A. Bounab presented the digital baseband feedback for extending the bandwidth of SQUID readout circuits. M. Pannetier-Lecoeur (CEA Saclay) reviewed magnetometers using superconducting flux concentrators with different types of sensors.

E. Pozzo di Borgo has measured the contribution of the ionosphere to magnetic noise at very low frequency. T. Schönau described dc-SQUIDs or SQIF with high transfer functions. M. Sen discussed on the preparation of various Bi compounds. A. Braginski presented the advantage of low field NMR when SQUID sensors are used. S. Henry made a SQUID magnetometer for the cryoEDM – neutron electric dipole measurement. M. Mück (Univ. Giessen) reviewed different techniques for SQUID microwave amplification. I. Soloviev introduced the Bi-SQUID for linearity. D-G. Crété presented TRT advances in resonators with high power handling capability. J-C. Villégier showed progress in fabrication of NbN SFQ IC. X. Jin proposes HTc qubits with intrinsic SQUIDs in Bi2212 loops. G. Oelsner proposed a readout of flux qubits using ballistic fluxons. M. Blamire presented how to control the Relative Phase of Cooper Pairs in a Josephson junction with synthetic antiferromagnetic coupling.

The poster session, at 18:00 on Monday, was allowed to extend during the full duration of the conference to promote discussions and exchange on specific topics. Most of these presentations will be available on http://www.euroflux.org and http://www.s-pulse.eu.

One of the interesting facts during this conference is the visit of the Laboratoire Souterrain Bas Bruit de Rustrel-Pays d'Apt mainly devoted to research in multidisciplinary physics (http://lsbb.oca.eu/spip.php?article95). It took place on Tuesday afternoon, just before the conference social event (visit of the « Palais des Papes » and a dinner nearby, in former cisterns of the town).

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euroflux2009

Superconductive Electronics: from Devices to Circuits and Systems

September 20 – 23, 2009
Avignon (FRANCE)

Fourth announcement of the second International Conference on Superconductive Electronics ***EUROFLUX2009: from devices to circuits and systems*** to be held in Avignon, France, on September 20-23, 2009 :
This conference is organized within the S-PULSE Support Action (Shrink-Path of Ultra Low Power Superconducting Electronics), funded by the Seventh Framework Programme of the European Commission.

The conference aim is to disseminate the knowledge to interested industry and research laboratories in three principal sub-domains: digital electronics, superconducting sensors and microwave devices and systems.

Topics
LTS and HTS junctions
SQUIDs and SQUID applications (magnetometry)
Radiation detectors
THz generation
Digital circuits and applications
Microwave devices (filters, SQUID amplifiers…)
Metrology devices
Quantum computing,
Superconducting spintronics
New applications

Confirmed invited speakers
Gregory Gol'tsman – Moscow St. Ped. Univ.
Johannes Kohlmann – PTB Braunschweig
Vincenzo Lacquaniti – INRIM Torino
Michael Mueck – Univ. Giessen
Myriam Pannetier – CEA Saclay
Thomas Skotnicki – ST Microelectronics
Nobuyuki Yoshikawa – Yokohama Nat. Univ.

Contacts
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Important dates
Late registration until September 21st, 2009
As September is in the high season, early hotel reservations are strongly recommended.

Chair
Denis Crété, Georges Waysand

Organisation committee
Pascal Febvre, Jannie Marfaing

Local committee
Rémi Blancon, Daniel Boyer,
Elisabeth Pozzo di Borgo, Christophe Sudre

Scientific committee
Vincenzo Lacquaniti, Michel Maignan,
Hans-Georg Meyer, Jürgen Niemeyer,
Alain Ravex, Horst Rogalla, Maurizio Russo, Ed Tarte, Jean-Claude Villégier, Dag Winkler

General schedule (updated on Sept. 20, 2009)

		Monday 21	
8:00		**REGISTRATION**	
9:00		**Conference opening**	
9:15	I-1	T. Skotnicki	- CMOS electronics
10:00	I-2	V. Lacquaniti, N. De Leo, M. Fretto, A. Sosso, M. Belogolovskii	- Tuning Electrical Properties of Nb/Al-AlOx/Nb by Temperature.
10:45		**Coffee-break**	
11:15	O-J1	S. Gildert, E.J. Tarte, C.M. Muirhead , M.S. Colclough, J.W.A. Robinson, M.G. Blamire	- Macroscopic Quantum Tunnelling and Conductance Measurements of SFIS π-junctions for Qubit Applications
11:40	O-J2	T. Ortlepp, O. Mielke, H. Toepfer	- Current-Phase-Relation Measurement of SIS Josephson Junctions
12:05	O-J3	J. Lesueur, T. Wolf, N. Bergeal, M. Sirena, G. Faini, R. Bernard, J. Briatico, P. Febvre	- HTSc Josephson NanoJonctions Made by Ion Irradiation for HF Operation
12:30		**Lunch**	
14:00	I-3	G. Gol'tsman	- Superconducting NbN Hot Electron Bolometer Mixer, Direct Detector and Single-Photon Counter: from Devices to Systems.
14:45	O-S1	Y. Divin, M. Lyatti, U. Poppe, K. Urban	- Hilbert Spectroscopy Based on High-Tc Josephson Junctions in Stirling Cooler for Liquid Identification
15:10	O-S2	I. Kawayama, Y. Doda, M. Murakami, K. Kajino, M. Inoue, A. Fujimaki, M. Tonouchi	- Optical Responses of YBCO Josephson Junctions and Nanobridges
15:35	O-S3	N. Curtz, E. Koller, M. Decroux, L. Antognazza, H. Zbinden	- Patterning YBCO Nanowires with a Focused Ion Beam
16:00		**Coffee-break**	
16:30	O-S4	L. Lolli, E. Taralli, C. Portesi, M. Rajteri, E. Monticone	- Single Photon Radiation Detector in the Visible Range
16:55	O-S5	V.P. Koshelets, P.N. Dmitriev, A.B. Ermakov, L.V. Filippenko, A.V. Khudchenko, N.V. Kinev, O.S. Kiselev, A.S. Sobolev, M. Yu. Torgashin	- Superconducting Integrated Receiver

17:20		**Coffee-break**	
17:40		**Poster session**	See the list of posters

Tuesday 22

8:15	I-4	J. Kohlmann, F. Müller, O. Kieler, R. Behr	- Series Arrays for Josephson Voltage Standards
9:00	I-5	N. Yoshikawa	- Component Design and Test of 50-GHz RSFQ Half-Precision Floating-Point Adders and Multipliers
9:45		**Coffee-break**	
10:15	O-D1	H. Gassara, P. Desgreys, P. Loumeau, P. Febvre	- Design of an I/Q Mixer for a Bandpass ΔΣ ADC in Superconducting Technology
10:40	O-D2	A. Andreski, H. Hilgenkamp	- Superconducting Static Circuits Using Magnetically Modulated π -loops
11:05	O-D3	A. Bounab, P. de Korte, M. Giard, L. Ravera, A. Cros, J. vander Kuur, B. Leeuwen, B. Monna, R. Mossel, A. Niewenhuizen	- Digital Baseband Feedback Circuit for Transition–Edge Sensors (TES) using SQUIDs
11:30	O-D4	D.O. Ledenyov, V.O. Ledenyov, O.P. Ledenyov	- Generation of Random Numbers with 1024 Quantum Random Number Generator on Magnetic Flux Qubits (QRNG_MFQ) in High Performance Computing (HPC) Systems
11:55		**Lunch**	
13:00		**- Visits of LSBB & Rustrel, or cultural event**	
19:00		**- Visit of Palais des Papes** **- Conference banquet**	

Wednesday 23

8:15	I-6	M. Pannetier-Lecoeur	- Applications of Superconductivity in Magnetometry
9:00	O-M1	E. Pozzo di Borgo, J. Marfaing, J-J. Bois, R. Blancon, G. Waysand, S. Gaffet, M. Auguste, D. Boyer, A. Cavaillou	- Ionosphere and Geomagnetic Background Noise Determination by $[SQUID]^2$ Underground Ultra Low Noise Magnetometer in the millihertz range
9:25	O-M2	T. Schönau, R. Stolz, V. Zakosarenko, L. Fritzsch, H.-G. Meyer	- DC SQUID – SQIF System with High Transfer Function
9:50		**Coffee-break**	

10:20	O-M3	N.M.S. Jahed, F. Sarreshtedari, M. Hosseini, M.A. Vesaghi, M. Banzet, J. Schubert, M. Fardmanesh	- Investigation of the Effectiveness of Different Shielding Methods on the Background Noise Cancellation of RF SQUID Gradiometer and Magnetometer Based Magnetic Imaging System
10:45	O-M4	M. Sen, A. Sen	- Bi223 SQUID Nano Sensors for NMRI
11:10	O-M5	A.I. Braginski, H. Dong, H.-J. Krause, L.Q. Qiu and Y. Zhang	- Low-Field NMR Measurements using High-Tc SQUID as Detector
11:35	O-M6	S. Henry	- SQUID Magnetometry for the cryoEDM experiment
12:00		**Lunch**	
13:25	I-7	M.Mück	- Low-Noise High-Frequency Amplifiers Based on DC SQUIDs
14:10	O-R1	V.K. Kornev, I.I. Soloviev, N.V. Klenov, O.A. Mukhanov	- Bi-SQUID with Highly Linear Voltage Response
14:35	O-R2	J. Kermorvant, K. van der Beek, B. Marcilhac, Y. Lemaître, J-C. Mage, J. Briatico, R. Bernard, J. Villegas	- Resonators with High Power Handling Capability
15:00	O-J4	J-C. Villégier, S. Bouat, V. Michal, R. Setzu, C. Socquet-Clerc, M. Heitzmann and D. Renaud	- Progress in Fabrication of NbN SFQ IC
15:25		**Coffee-break**	
15:55	O-Q1	X.Y. Jin, J. Lisenfeld, Y. Koval, A. Lukashenko, A.V. Ustinov, P. Müller	- $Bi_2Sr_2CaCu_2O_{8+\delta}$ Intrinsic SQUIDs as Possible High-Tc Phase Qubits
16:20	O-Q2	G. Oelsner, S.H.W. van der Ploeg, E. Il'ichev, H.-G. Meyer	- Towards a Readout of Flux Qubits using Ballistic Fluxons
16:45	O-J5	J.W.A. Robinson, G.B. Halász, M.G. Blamire	- Controlling the Relative Phase of Cooper Pairs in a Josephson Junction with Synthetic Antiferromagnetic Coupling
17:10		**Wrap-up**	

List of poster presentations

Code	Author list	Abstract title

P-1	A.A. Bannykh, J.W.A. Robinson, M.G. Blamire, S. Gildert, C. Muirhead, O. Mielke, E. Tarte	Ferromagnetic Josephson Tunnel Junctions
P-2	K. Senapati, Z.H. Barber	Fabrication and Characterization of Sidewall Shunted Overdamped Josephson Junctions
P-3	J-C. Villegier, S. Bouat, P. Cavalier, J.F. Jacquinot, A. Aguilal, C. Antoine, G. Lamura, A. Andreone	Synthesis of NbN/MgO Multilayers
P-4	Y.Y. Divin, V.N. Gubankov, I.I. Gundareva, O.Y. Volkov, V.V. Pavlovskiy	Josephson Spectral Analysis of Log-Periodic Antenna
P-5	P. Cavalier, L. Maingault, J-C. Villegier, Ph. Feautrier	Elaboration and Characterization of NbN SSPD and SWIFTs Detectors
P-6	D.V. Balashov, M.I. Khabipov, A.B. Zorin, V.A. Oboznov, V.V. Bolginov, A.N. Rossolenko, V.V. Ryazanov	Integration of SFS π-Junction into SFQ Toggle Flip-Flop Circuit
P-7	H. Jin, Y. Okamoto, K. Yaguchi, Y. Yamanashi, N. Yoshikawa	Access Time Measurement of Josephson/CMOS Hybrid Memories using SFQ Time-to-Digital Converter
P-8	H. Murakami, R. Kitamura, I. Kawayama and M. Tonouchi	Magneto-Optical Detection of Magnetic Flux Quanta in High-Tc Superconductor Devices
P-9	J.R. Ngankio-Njila, D-G. Crété	Concept of Superconducting Pipe-line A/D Converter
P-10	C.J. Fourie, J-P. Taylor	Cryocooler Magnetic Shield Characterisation with SQUIDs

P-11	S.T. Keenan, C.P. Foley, J.A. Young	HTS Planar SQUID Gradiometer Based Magnetic Gradient Tensor System
P-12	V. Kornev, I. Soloviev, N. Klenov, O. Mukhanov	Design Tradeoff in Multi-Element Josephson Structures
P-13	A.V. Shadrin, K.Y. Constantinian, G.A. Ovsyannikov, V.K. Kornev, I.I. Soloviev, S.V. Shitov	Metaloxide Superconducting Quantum Interference Filters for Microwave Applications
P-14	M. Sen, A. Sen	Bi223 Superconductor Magnet with Microwave Interaction to Seperate Impurities from Minerals
P-15	N.V. Klenov, A.V. Sharafiev, S.V. Bakurskiy, V.K. Kornev, N.G. Pugach, T.S. Rumyantseva	Possible Implementations of SFS -Junctions in Josephson Qubits