XVII Krajowa Konferencja Nadprzewodnictwa

Nadprzewodnictwo i inne stany emergentne w układach z silnie skorelowanymi elektronami

25-30.10.2015, Karpacz, Hotel Artus

Program i streszczenia

INTiBS PAN
WROCŁAW

XVII Krajowa Konferencja Nadprzewodnictwa

Nadprzewodnictwo i inne stany emergentne w układach z silnie skorelowanymi elektronami

25–30 października 2015 roku
Karpacz, Hotel Artus

Proximitized NbN/NiCu superconductor/ferromagnet nano-bilayers for single photon detection

Wojciech Słysz[1*], M. Guziewicz[1], A.Klimov[1], R. Puźniak[2], M. Juchniewicz[1], M. A. Borysiewicz[1], R. Kruszka[1], M. Węgrzecki[1], A. Łaszcz[1], A. Czerwiński[1], and Roman Sobolewski[1,3]

[1]*Institute of Electron Technology, Al. Lotników 32/46, 02-668 Warsaw, Poland*
[2]*Institute of Physics PAS, Al. Lotników 32/46, 02-668 Warsaw, Poland*
[3]*University of Rochester, Rochester, NY-14627-0231, USA*
[*]*e-mail: wslysz@ite.waw.pl*

Superconducting single-photon detectors (SSPDs) based on resistive hotspot formation in a superconducting nanostripe upon optical photon absorption are presently regarded as the best high-performance, ultrafast photon counters

One of the possible approaches towards the SSPD performance improvement is modification of a super-conducting material. In our case, we implement superconductor/ferromagnet (S/F) nano-bilayers consisting on nm-thick NbN/NiCu and NbTiN/NiCu films

In our presentation, we discuss structural properties of our S/F bilayers with the main emphasis on the epitaxy of the individual films and the quality of the S-F interface (TEM cross-sections with the atomic-level resolution). Electron transport of patterned bilayers, such as resistance and critical current density dependences on temperature, and current-voltage characteristics, were studied and compared to those of uncovered S layers.

The relief of magnetic induction in hard SC at thermomagnetic avalanches

E. I. Kuchuk[1*], V. V. Chabanenko[1], I. Abaloszewa[2], A. Nabiałek[2], V. F. Rusakov[3]

[1]*Donetsk Physico-Technical Institute, NAS, Kiev, Ukraine*
[2]*Institute of Physics, Polish Academy of Sciences, Warsaw, Poland*
[3]*Donetsk National University, Vinnitsa, Ukraine*
[*]*e-mail: elenkuchuk@gmail.com*

We present the results of analysis of magneto-optical images obtaining during developing thermomagnetic avalanches in superconductors (SC). There are some new peculiarities in behavior of magnetic flux.

1. As a result of avalanche, during its entrance (or exit) to the superconductor's volume, paramagnetic (or diamagnetic) circular currents in diamagnetic (or paramagnetic) regions of the SC appear, which determine the local reversal of magnetic induction profile.

2. It was found that the velocity of the avalanche front has a maximum in the initial stage and then decreases oscillating manner with increasing depth of penetration into the SC. The frequency of the oscillation is about 1 kHz, depending on the physical characteristics of the SC.

3. The tilt angle of the profile of the magnetic induction at the front of the avalanche remains constant during the movement of the avalanche, i.e. the critical current of the front does not change.

4. The destruction of the critical state of SC disc due to the thermomagnetic avalanches in the case of magnetic flux trapping occurs with the formation Meissner hole.

Piątek, 30 października 2015 r.

9:00 – 10:30 **Sesja XIV**

9:00 – 9:35 **PIĄ–1 (Z)** J. Karpinski, S. Katrych, K. Rogacki, A. Pisoni, R. Gaal, N. D. Zhigadlo and L. Forro „Monokryształy nadprzewodników na bazie FeAs: struktura i własności nadprzewodnikowe"

9:35 – 9:55 **PIĄ–2 (A)** A. Kołodziejczyk, K. Rogacki, Ł. Bochenek, T. Cichorek, B. Wiendlocha, J. Toboła, S. Kaprzyk, R. Zalecki „First superconducting itinerant ferromagnet Y_9Co_7"

9:55 – 10:15 **PIĄ–3 (A)** T. Domański, I. Weymann, M. Barańska „Constructive feedback of the superconductivity on the Kondo state in quantum dots"

10:15 – 10:30 **PIĄ–4 (B)** M. Zegrodnik, J. Kaczmarczyk, J. Spałek „Superconductivity in the t-J-U-V model: Gutzwiller wave function solution"

10:30 – 11:00 *Przerwa kawowa*

11:00 – 13:00 **Sesja XV**

11:00 – 11:35 **PIĄ–5 (Z)** B. Dabrowski „Strongly-correlated corner-shared networks of 3d transition metal and oxygen"

11:35 – 12:10 **PIĄ–6 (Z)** T. Cichorek „Stany emergentne w izolatorze Kondo $CeOs_4As_{12}$"

12:10 – 12:30 **PIĄ–7 (A)** V. H. Tran, Z. Bukowski „The coexistence of superconductivity and charge density wave in $LaCu_{1-x}Ag_xSb_2$"

12:30 – 12:45 **PIĄ–8 (B)** M. J. Winiarski, B. Wiendlocha, P. Wiśniewski, D. Kaczorowski, T. Klimczuk „Superconductivity in $(Sc,Y,Lu)V_2Al_{20}$ cage compounds – an experimental and theoretical study"

12:45 – 13:00 **PIĄ–9 (B)** G. Michałek, T. Domański, B. R. Bułka, K. I. Wysokiński „Nonlocal Andreev reflection in three-terminal hybrid devices"

13:00 – 14:30 *Obiad*

Sesja plakatowa I – „Eksperyment"

E–1 J. Sosnowski „Critical current analysis in fast neutrons irradiated HTc multilayered superconductors"

E–2 W. Słysz, M. Guziewicz, A.Klimov, R.Puźniak, M. Juchniewicz, M. A. Borysiewicz, R. Kruszka, M. Węgrzecki, A. Łaszcz, A. Czerwiński, R. Sobolewski „Proximitized NbN/NiCu superconductor/ferromagnet nano-bilayers for single photon detection"

E–3 E. I. Kuchuk, V. V. Chabanenko, I. Abaloszewa, A. Nabiałek, V. F. Rusakov „The relief of magnetic induction in hard SC at thermomagnetic avalanches"

E–4 A. Abaloszew, I. Abaloszewa, M. Konczykowski, M. A. Tanatar, R. Prozorov „Vortex pinning and creep in single crystals BaKFeAs with intrinsic and irradiation-induced disorder"

E–5 P. Gierłowski „Superconducting niobium cavity for penetration depth and surface resistance measurements"

E–6 W. M. Woch, M. Chrobak, M. Kowalik, R. Zalecki, J. Przewoźnik, C. Kapusta „Magnetoresistance and irreversibility fields of bismuth based 1G tape"

E–7 M. Chrobak, M. Kowalik, W. M. Woch, R. Zalecki „Thermal fluctuations of YBCO based 2G tape"

E–8 M. Kowalik, A. Szeliga, W. Tokarz, W. M. Woch, M. Chrobak, R. Zalecki „Critical currents and full penetration fields of YBCO based 2G tape"

E–9 M. Chrobak, W. M. Woch, M. Kowalik, R. Zalecki, J. Przewoźnik, C. Kapusta „Magnetic properties of *c*-axis oriented YBCO thin film"

E–10 W. M. Woch, M. Chrobak, M. Kowalik, R. Zalecki, J. Niewolski „Magnetoconductance of $Bi_{1.6}Pb_{0.4}Sr_2Ca_2Cu_3O_x$ bulk superconductor in the fluctuation region"

E–11 M. Kowalik, R. Zalecki, W. M. Woch, M. Chrobak „Critical current of BiSCCO 2:2:2:3 films on silver substrate"