2438th Conference

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Keynote Forum

Day 1

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

D V G L N Rao

University of Massachusetts, USA

Optical Fourier holography with thin films of bacteriorhodopsin for cancer diagnostics

Optical information processing using nonlinear optical materials is receiving a lot of attention due to the ever-increasing demand for photonic device applications. We studied transient Fourier holographic gratings based on photoinduced isomerization properties of thin polymer films of the protein complex Bacteriorhodopsin (bR). Real-time medical image processing is demonstrated by recording and reconstructing the transient photoisomerization grating formed in the bR film using Fourier holography. The diffraction efficiency of the grating is optimum when the intensity of the reference and object beams are matched. In the Fourier processed object beam transmitted through the mammogram high spatial frequencies corresponding to microcalcifications are on the edges and low spatial frequencies corresponding to the dense tissue are at the center. Desired spatial frequencies including both high, mid and low bands in the object beam (corresponding to different sizes of the microcalcifications in the mammogram) are reconstructed by controlling the reference beam intensity. The results are in agreement with a theoretical model based on photoisomerization grating. We exploited this technique for processing mammograms in real time for detecting microcalcifications buried in the soft tissue for possible early detection of breast cancer. A significant feature of the technique is the ability to transient display of a selected band of spatial frequencies in the reconstructing process which enables the radiologists to study the features of interest in great detail. A technician can record a movie of all the features and the radiologist can leisurely look at it leisurely. The hologram can be erased in a few seconds and the same film is ready to record a new hologram.

Biography

D V G L N Rao had a brilliant academic record at Andhra University where he got the degrees BSc (Honors), MSc and DSc physics. He was a Postdoc for two years each at Duke and Harvard Universities and taught at UMass Boston for about fifty years starting in 1968. As Emeritus Professor he continues to guide graduate students. His group has a niche for optical Fourier techniques and low power nonlinear optics with biological materials. He published over 120 papers in prestigious journals like Nature, Physical Review Letters etc. and has ten patents, one of which on Fourier Phase Contrast Microscopy is licensed to industry for marketing the technology.

raod@umb.edu

Notes:

Chi Yu Hu, Res. Rev. J Mat. Sci. 2018, Volume 6
DOI: 10.4172/2321-6212-C10-040

Chi Yu Hu

California State University, USA

Nature has a powerful pick-up tool, supported by a simple universal mechanism, the Stark-effect induced Gailitis resonance

The pursuit of anti-Hydrogen production has been ongoing for decades. That is due to the lack of accurate three-body scattering calculations. Recent calculation revealed the presence of Gailitis resonance. This resonance enhances the production rate. The search for low energy nuclear fusion or LENR has been going off and on for more than three decades. A path to LENR has been shown possible using nature's pick-up mechanism, the Gailitis resonance! There are many resonances with unknown formation mechanism appearing in seemingly unrelated fields. We will try to examine as many as possible.

Biography

Chi Yu Hu is an Emeritus Professor in the Department of Physics and Astronomy California State University at Long Beach. She has completed her PhD in 1962 at MIT Cambridge and Assistant professor at 1963. She has extended her valuable service in this research field for several years and has been a recipient of many award and grants. Her international experience includes various programs, contributions and participation in different countries for diverse fields of study. Her research interests reflect in his wide range of publications in various national and international journals.

Chiyu.Hu@csulb.edu

Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Oomman K Varghese

University of Houston, USA

Advanced materials for solar photoelectrochemical fuel generation

Fuel generation using solar energy has been widely investigated as a potential pathway for sustainable development in the energy sector. Various technologies, normal and hybrid, have emerged in recent years to generate fuels from sources such as water and carbon dioxide utilizing the ultraviolet/visible or thermal (or both) components of the solar spectrum. Solar photoelectrochemical fuel generation is one such technology that utilizes the photocatalytic properties of semiconducting materials to convert energy in the ultraviolet/visible part of the solar spectrum to fuels. The process does not require elevated temperature or pressure conditions. The sunlight to fuel conversion efficiency is, however, not yet high enough to apply the technology on a commercial scale. The primary limitation is in the inability of the photocatalysts to absorb visible light photons or transport the photo-generated charge carriers to the surface for redox reactions. Wide band gap photocatalysts such as titanium dioxide transport charge carriers relatively better than narrow band gap semiconductors such as iron oxide; however, wide band gap materials utilize only the ultraviolet photons. We recently introduced a strategy that consists of joining a wide band gap and a narrow band gap nanoarchitecture to form a heterostructure photoelectrode. Such electrodes exhibited promising characteristics for broad-spectrum light utilization. These results along with the current state of the technology will be discussed in this presentation.

Biography

Oomman K Varghese received PhD in Physics from Indian Institute of Technology Delhi (IITD), India in 2001. He is currently an Associate Professor in the Physics Department, University of Houston. He has published over 100 peer-reviewed articles, one book, a book chapter, and two patents. His publications have received over 31000 citations (Google Scholar h-index is 67). In 2011, Thomson Reuters ranked him 9th among 'World's Top 100 Materials Scientists' in the past decade. In 2014, 2015 and 2016 he received the title 'Highly Cited Researcher' and had a name listed in Thomson Reuters' World's Most Influential Scientific Minds.

okvarghese@uh.edu

Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Qiu-he Peng

Nanjing University, China

Magnetars by condensed matter physics

1. We present the microscopic origin of the super-strong magnetic fields in magnetars. The ultra-strong magnetic field of the magnetars originates really from the induced paramagnetic moment of the $^3P_2$ superfluid with a significant mass more than $0.1m_\odot$ in a condition when their interior temperature

$T_7 \ll \eta$ (below the Curie temperature), $\eta = \frac{m(^3P_2)}{0.1m_\odot} B_{NS6}^{-1} [\frac{\Delta_n(^3P_2)}{0.05MeV}]^{1/2}$, here $\Delta_n(^3P_2)$ is the energy gap of the neutron $^3P_2$ Cooper

pairs. In the case, a phase transition from paramagnetism to ferromagnetism due to the induced paramagnetic moment of $^3P_2$ Cooper pairs in the presence of background magnetic field.

The upper limit of the magnetic field for the magnetars is $B_{\max}^{(in)}(^3P_2) \approx 2.02\times10^{14}\eta \quad gauss$

2. We find that the electron Fermi energy, $E_f(e)$, increases with the magnetic field strength and it is proportional to $B^{1/4}$ under the super strong magnetic field. We note that this result is exactly the opposite of the popular idea that the electron Fermi energy decreases with the magnetic field. The key reason for the dilemma is that an incorrect formulae of the microscopic number of states for the electrons in the intense magnetic field from some internationally well known popular textbooks on statistical physics has been repeatedly quoted by many authors. An important inference from our idea is the direct Urca process is permitted in the magnetars.

3. We propose a new mechanism for the production of the high soft X-ray luminosities of magnetars. In particular, the Fermi energy of the electrons is higher than 60MeV in ultra-strong magnetic fields, $B \gg B_{cr}$ ($=4.414\times10^{13}$ gauss), which is much higher than the Fermi energy of the neutrons. In this case, the process of electron capture (EC) by protons around the proton Femi surface would dominate in magnetars. The outgoing high-energy neutrons due to EC process can easily destroy the $^3P_2$ Cooper pairs through the nuclear strong interaction. When one Cooper pair is destroyed, the orderly magnetic energy $2\mu n$ B would be released and transformed into disorder thermal energy, then it may be radiated as soft X-rays. The Energy is in the X-ray range. The total magnetic energy of $^3P_2$ Cooper pairs can be estimated as $1.0\times10^{47}B_{15}(m(^3P_2)/0.1m_\odot)ergs$. This energy can maintain over 10^{4-6} *yrs* for $L_X \approx 10^{34}\text{-}10^{36}$ *ergs/s*. We have also calculated the theoretical luminosities of magnetars, and our results compared very well with observations of magnetars.

Biography

Qiu-he Peng graduated from Department of Astronomy, Nanjing University at 1960 firstly taught at Peking University for 18 years and then is teaching at Nanjing University. He is mainly engaged in nuclear astrophysics, particle astrophysics, and galactic astronomy research. In the field of nuclear astrophysics, his researches involve neutron stars (pulsars), the supernova explosion mechanism and the thermonuclear reaction inside the star, the synthesis of heavy elements and an interstellar radioactive element such as the origin of celestial 26Al. 225 papers of him have been published.

qhpeng@nju.edu.cn

DOI: 10.4172/2321-6212-C10-040

5th International Conference on
Theoretical, Materials and Condensed Matter Physics
November 26-28, 2018 | Los Angeles, USA

Debabrata Saha

Independent Research Scientist, USA

Natural field: A link missing in contemporary physics

Natural field is a recently found new fundamental entity of nature in addition to existing four fundamentals, namely, Gravitation, Coulomb, Strong and Weak forces. It distinctly distinguishes itself from existing four in its ability to cause self-interference. The finding of Natural field came as the outcome of two observations made on shortcomings of Contemporary Physics. The first one is the incorrectness of de Broglie's wave-particle duality (WPD), and the second one is a set of repeated experimental evidence for which Contemporary Physics offers no explanation. Natural field offers an explanation for this set. It is postulated that a matter particle, by virtue of its inertial mass, is always surrounded by a Natural field that follows from a set of dynamical equations. An important characteristic of Natural field, which follows from dynamical equations, is its ability to induce itself on to others upon impact. The notion of Natural field is easily extended from matter to light simply by replacing particle inertial energy with the photonic energy of light. Postulate of Natural field along with related theoretic analyses is supported by five independent set of repeated experimental results, namely, electron diffraction, reflection & refraction of light, splitting of light ray at a refracting surface without alteration in photonic frequency, double-slit interference pattern with photon passing through one slit at a time and not both slits simultaneously, and Braggs' X-ray diffraction as well. Natural field exhibits characteristics common to both light and matter particle. It provides a unification of matter and light.

Biography

Debabrata Saha is a research scientist who recently completed a teaching assignment in NIT, Karnataka, India as an Adjunct Professor. Before this, he taught for twenty-one years as a tenured member of a faculty, and, thereafter, worked as President of a consulting firm, both in the USA. He is a former Chairman of Washington DC–Northern Virginia Section of IEEE Information Theory Society, USA. His academic background includes earned degrees in (1) Science–BSc, Physics (Calcutta University), Technology–BTech, Electronics (Calcutta University), (3) Applied Science–MASc, Communication (University of Toronto), (4) Engineering–PhD, Computer, Information and Control Engineering (University of Michigan).

stempo15@gmail.com

Notes:

2438th Conference

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Keynote Forum

Day 2

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Yutaka Ohno

Tohoku University, Japan

Chemical nanoanalyses of Si grain boundaries towards the fabrication of high- functional Si solar cells

Polycrystalline materials with grain boundaries (GBs), involving excess free energy because of their structural imperfection, can reduce their energy by the nanoscopic structural changes of the GBs via impurity segregation. Those local changes at GBs can stabilize non-equilibrium nanostructures, resulting in the drastic change in the macroscopic properties of those materials. The mechanism of GB segregation is, however, far from being understood due to difficulties in characterizing both crystallographic and chemical properties of the same GB at atomistic levels. We have therefore developed an analytical method to determine the impurity segregation ability on the same GB at the same nanoscopic location by a joint use of atom probe tomography (APT) and scanning transmission electron microscopy (STEM) combined with *ab initio* calculations, and discussed the segregation mechanism at atomistic levels. Three-dimensional distribution of impurity atoms was systematically determined at the typical large-angle GBs, small-angle GBs, and dislocations on GBs in Si by APT with a high spatial resolution (about 0.4nm), and it was correlated with the atomic stresses around the GBs estimated by *ab initio* calculations based on atomic-resolution STEM data. It was shown that impurity atoms preferentially segregated at the atomic positions under specific stresses so as to attain a more stable bonding network by reducing the local stresses. For example, the number of segregating oxygen atoms per unit GB area (N_{GB}) is proportional to both the number of the stressed positions per unit GB area (n_{bc}) and the average concentration of oxygen atoms around the GB ([O_i]) with $N_{GB} \sim 50n_{bc}[O_i]$.

Biography

Yutaka Ohno (PhD: Physics) is working in the Institute for Materials Research, Tohoku University (http://www-lab.imr.tohoku.ac.jp/~yutakaohno/). He is also working in the CREST research project (Grant No. JPMJCR17J1 (2017-2023)) in Japan Science and Technology Agency. A focus is on quantitative analyses of the impurity segregation ability of grain boundaries in Si and compounds by atom probe tomography (APT, with a spatial resolution less than 0.4nm) combined with scanning transmission electron microscopy (STEM) and *ab initio* calculations, but also on the study of atomistic structures of semiconductor nanostructures by optical measurements (cathodoluminescence, micro-photoluminescence, near-field optical measurements) under TEM.

yutakaohno@imr.tohoku.ac.jp

Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Yuko Ichiyanagi

Yokohama National University, Japan

Characterization of ferrite nanoparticles and application for theranostics

Magnetic nanoparticles have drawn attention recently due to their interesting nanoscopic features and potential applications for not only recording electric materials but also in the biomedical field. Previously, we obtained monodispersive magnetic nanoparticles (MNPs) by an original wet chemical method and reported magnetic, structural and thermal properties. Local structure analysis by X-ray absorption fine structure (XAFS) was useful to estimate nanoscale materials. We also suggested some biomedical applications using MNPs after functionalization. These functional MNPs were further introduced into cells. Furthermore, cancer cell selective MNPs were developed. Based on these techniques, we proposed a therapeutic method of magnetic hyperthermia. Now we propose "theranostics" by development nanoparticles for diagnostic and therapeutic materials simultaneously. For the therapeutic part, several kinds of ferrite NPs were prepared and AC magnetic measurements were performed. The relationship between the imaginary part of magnetic susceptibility χ" and the increase in temperature in the AC field was estimated. We have carried out *in vitro* experiments using cultured human breast cancer cells, and a drastic hyperthermia effect was observed. As one of the diagnostic method, mass spectrometric imaging (MSI) was proposed. With this method, the targeting analyte can be detected only with the nanoparticles as matrices, and simultaneously we can see the distribution of the materials by mapping the spectra. By means of our matrices, targeting analyte of very low molecular weight was successfully detected. Furthermore, effective parameters for MRI contrast agent, signals of the third harmonic components for magnetic particle imaging (MPI) were observed.

Biography

Yuko Ichiyanagi is an Associate Professor at Yokohama National University since 2009 (Applied Physics) and Osaka University since 2017. She was invited and chaired at several international conferences. Now she has published more than 50 papers and books. has been serving as an International Advisory Committee Member of some reputed conferences.

yuko@ynu.ac.jp

Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Taro Toyoda

The University of Electro-Communications, Japan

The appearance of anisotropic optical absorption, ground state energy, and crystal growth of CdSe quantum dots adsorbed on the (001) and (102) surfaces of anatase-TiO_2

The present study focuses on the effect of the substrate surfaces with different crystal orientations on optical absorption and ground state energy in a system comprising CdSe quantum dots (QDs) adsorbed on (001) and (102) surfaces of anatase-TiO_2(A-TiO_2). We applied photoacoustic (PA) spectroscopy based on the photothermal phenomenon to characterize the optical absorption, not only in the bandgap absorption but in the sub-bandgap region owing to high sensitivity. Photoelectron yield (PY) spectroscopy is useful for determining the absolute ground state energy level of QDs. Adsorption time dependence by absorbance measurements shows that (1) the adsorption rate of CdSe QDs on A-TiO_2(001) is higher than that of A-TiO_2(102) in agreement with our DFT calculations ((001) >> (101) > (102)), and (2) the diameter increasing rate of CdSe QDs on A-TiO_2(102) is higher than that of A-TiO_2(001), indicating the anisotropic crystal growth. The ground state energy levels of CdSe QDs on A-TiO_2(102) are deeper than those on A-TiO_2(001), suggesting the impossibility of the sensitization from the excited state of CdSe QDs to the conduction band of A-TiO_2(102). Deeper value of the ground state energy level of CdSe QDs on A-TiO_2(102) than those on A-TiO_2(001) is the possibility due to the difference of the permittivity of A-TiO_2(001) and A-TiO_2(102).

Biography

Taro Toyoda has completed his DSc from Tokyo Metropolitan University and Assistant Research Officer at National Research Council of Canada. After working at Fuji Electric Company and Nippon Mining Company, he was appointed as a Professor of The University of Electro-Communications. His research focuses on basic studies of optical properties in semiconductor quantum dots including photoexcited carrier dynamics and their applications to photovoltaic quantum dot solar cells. He has published more than 200 papers in reputed journals.

toyoda@pc.uec.ac.jp

Notes:

Rita John, Res. Rev. J Mat. Sci. 2018, Volume 6
DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Rita John

University of Madras, India

CoFeNbZ (Z=l, Si and In) quaternary heusler alloys: A first principle study

Heusler alloys are intermetallic compounds made up of four interpenetrating fcc sublattices. Some of them have multifunctional nature i.e. a combination of functions (properties) within the same compound, which have technological applications. Co-based Heusler compounds gained considerable attention in the recent past due to their high Curie temperature, high spin polarization and tunable electronic structure with possible applications in spintronics. They have the general composition X_2YZ where X and Y are transition metals and Z is an sp element. Quaternary Heusler alloys (QHA) are formed when one of the X atoms is replaced by a third transition metal. In this study, the structural, electronic, magnetic and transport properties of CoFeNbZ (Z=Al, Si and In) quaternary Heusler compounds are investigated employing the full potential linearized augmented plane wave (FP-LAPW) method implemented in WIEN2k code within the density functional theory prescription. The exchange and correlation effects are treated by using generalized gradient approximation (GGA). From the electronic and magnetic properties, it is found that CoFeNbAl is a half-metal with a spin flip gap of 0.33 eV and satisfies the $M_t=Z_t-24$ Slater Pauling rule. It is known that GGA underestimates the band gaps of semiconductors and insulators. Here, the Tran and Blaha modified Becke Johnson potential (TB-mBJ) is used to obtain accurate band gaps. The spin-flip gap increases to 0.34 eV with the use of TB-mBJ and the nature of gap changes from indirect to direct. The half-metallic gap in CoFeNbAl arises due to the complex hybridization between the d-states of transition metals Co, Fe, and Nb. CoFeNbIn has metallic behavior in both spin channels. CoFeNbSi is a near half-metal with a near integer magnetic moment. The effect of hydrostatic strain on the magnetic and half-metallic properties of CoFeNbAl is determined. The transport coefficients such as the Seebeck coefficient, electrical conductivity, and thermal conductivity are computed in combination with the second principles BoltzTraP code. In the spin-up channel, electrical conductivity decreases as a function of temperature whereas it increases in the spin down the channel for CoFeNbAl. This affirms the metallic behavior in the spin-up channel and the semiconducting behavior in the spin down channel. The high spin polarization and robustness of half-metallicity against hydrostatic strain make CoFeNbAl a potential candidate for spintronic applications.

Biography

Rita John is Professor and Head, Department of Theoretical Physics, University of Madras, Chennai, India. She is Visiting Professor on Fulbright Fellowship at the Department of Physics and Astronomy, Texas Christian University, Fort Worth, Texas, USA (2014). Her area of research includes Computational/Theoretical Condensed Matter Physics. She has published over 50 papers in peer-reviewed journals. The book titled 'Solid State Physics' authored by her and published by Tata McGraw Hill publisher (2014) is used by Physics graduate students globally. She has edited and published 4 other books on advanced topics in Physics. She has also authored a book titled '*Science uncovers the signature of God*' highlighting the scientific facts recorded in the Holy Bible. She is the recipient of various awards and prizes for her academic contributions.

ritajohn.r@gmail.com

Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Feroz Alam Khan

Bangladesh University of Engineering and Technology, Bangladesh

Influence of Mn substitution on magnetoresistance and magnetic properties of $(Fe_{1-x}Mn_x)_{75}P_{15}C_{10}$ alloy ribbons

Magnetic properties have been measured on a rapidly cooled melt spun $(Fe_{1-x}Mn_x)_{75}P_{15}C_{10}$ (x=0, 0.05, 0.1, 0.2 and 0.3) amorphous alloys ribbons. The amorphous property of the ribbons have been confirmed by X-ray diffraction and scanning electron microscopy analysis. The observed magnetic properties e.g. magnetization and magnetoresistance and the ac permeability indicate that $(Fe_{1-x}Mn_x)_{75}P_{15}C_{10}$ goes through a transition from the ferromagnetic to antiferromagnetic-like phase within the temperature range of observation. Both positive and negative magnetoresistance have been observed at room temperature for different electrical circuital configurations as a function of the applied magnetic field. Saturation magnetization (M_s) and the low field coercivity (H_c) at room temperature indicates the magnetic softness of the alloy. The temperature dependent ac permeability shows high effective permeability at room temperature and shows a permeability minima around 450K. The ac permeability shows a maximum around 1kHz and diminishes at the high-frequency regime. The magnetoresistance of all the samples goes through a minimum around 4kOe showing a spin-valve type behavior which may be attributed to the suppression of quantum localization of the spin moments.

Biography

Feroz Alam Khan has completed his PhD degree from the Bangladesh University of Engineering and Technology (BUET) and his Postdoctoral Research at the University of Delaware, USA, University of Uppsala, Sweden, and the University of Tsukuba, Japan. He is a Professor in Physics at the Bangladesh University of Engineering and Technology (BUET). He is a leader of a research group called Dhaka Materials Science Group under a scientific research collaboration with the International Science Programs (ISP), Uppsala University, Sweden. He has supervised more than 25 postgraduate degrees that include Masters, MPhil, and PhD degrees. He has to his credit more than 50 research publications. He is involved in promoting basic science research through the establishment of regional research collaborations with the south-east Asian Universities under the umbrella of International Science Programs.

fakhan@phy.buet.ac.bd

Notes:

2438th Conference

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Keynote Forum

Day 3

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

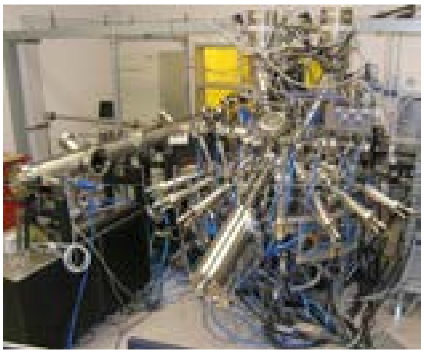
November 26-28, 2018 | Los Angeles, USA

Ivan Bozovic

Brookhaven National Laboratory, USA

On the road to room-temperature superconductivity?

Superconductivity in cuprates has many mysterious facets, but the most important question is why the critical temperature (T_c) is so high. Our experiments target this question. We use atomic-layer-by-layer molecular beam epitaxy to synthesize atomically perfect thin films and multilayers of cuprates and other complex oxides. By atomic-layer engineering, we optimize the samples for a particular experiment.



I will present the results of a focused and comprehensive study that took twelve years and over two thousand cuprate samples, perhaps without precedence in Condensed Matter Physics. We have measured the key physical parameters of the normal and superconducting states and established their precise dependence on doping, temperature, and external fields. This large data basis contains a wealth of information and constraints tightly the theory. One striking conclusion is that superconducting state cannot be described by the standard Bardeen-Cooper-Schrieffer theory, anywhere in the phase diagram. Next, the rotational symmetry of the electron fluid in the normal metallic state above T_c is always spontaneously broken-the so-called "electronic nematicity"-unlike in standard metals that behave like Fermi Liquids. Finally, the insulating state on the underdoped side is also unusual, with mobile charge clusters formed by localized pairs. All these features are quite exceptional, paint a new picture of high-T_c superconductivity in cuprates, and point to a new direction in search of new high-T_c superconductors.

Biography

Ivan Bozovic received his PhD in Solid State Physics from Belgrade University, Yugoslavia, where he was later elected a professor and the Physics Department Head. After moving to the USA in 1985 he worked at Stanford University, the Varian Research Center, and 1999-2002 in Oxxel, Bremen, Germany. Since 2003, he is the MBE Group Leader at Brookhaven National Laboratory, and since 2014 also an Adjunct Professor of Applied Physics at Yale University. He is a Member of European Academy of Sciences, Foreign Member of the Serbian Academy of Science and Arts, Fellow of APS, and Fellow of SPIE. He received the Bernd Matthias Prize for Superconducting Materials, SPIE Technology Award, the M. Jaric Prize, the BNL Science, and Technology Prize, was Max Planck and Van der Waals Lecturer and is a Gordon and Betty Moore Foundation PI. His research interests include basic physics of condensed states of matter, novel electronic phenomena including unconventional superconductivity, innovative methods of thin film synthesis and characterization, and nanoscale physics. He has published 11 research monographs and over 280 research papers, including 25 in Science and Nature journals.

bozovic@bnl.gov

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Gennadiy Filippov

Chuvash State Pedagogical University, Russia

Passage of accele4rated high charged ions through a system of parallel thin films

The passage of charged projectiles through the porous structure is investigated for the goal of calculation the forced action of a wave packet (or the classical particle bunch) on the porous walls. An analysis of the passage of quantum particles is performed by numerically solving the Schrödinger equation. In the framework of classical electrodynamics, the polarization force acting on the charge is calculated. In the problem of the passage of ions with large values of charges through ultrathin carbon films, the possibility of pore performing in the films is analyzed. In order to understand the process more clearly, a mathematical modeling of the film is performed, accompanied by a clarification of the most important polarization properties. Calculations showed the possibility of perforating the film due to the influence of ponderomotive forces generated by the strong polarization field of the wave packet of the passing ion.

Biography

Gennadiy Filippov has his expertise in particle-solid interaction physics. He has completed his PhD at the age of 54 years from Tomsk State University (Russia). He is head of the Laboratory of Biophysics and Bio-nanotechnology in the Chuvash State Agricultural Academy and Professor in the Chuvash State Pedagogical University in Cheboksary, Russian Federation.

filippov39-gm@yandex.ru

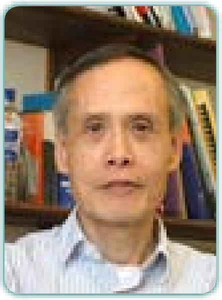
Notes:

DOI: 10.4172/2321-6212-C10-040

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA



Joseph Poon

University of Virginia, USA

Amorphous magnetic films for spintronics

Spintronics (SPIN TRansfer elecTRONICS) was introduced by SA Wolf in 1996 as the name of a DARPA project to develop both a non-volatile magnetoresistive random access memory (MRAM) and also magnetic sensors for specialized applications. Today, spintronics has already shown promise in ultra-low power and non-volatile information processing and data storage technology. A recent advance in spintronic material systems will be reviewed. For the rest of my talk, I will focus on amorphous rare-earth-transition-metal (*a*-RE-TM) thin films that exhibit perpendicular magnetic anisotropy (PMA). *a*-RE-TM are ferrimagnets with two ferromagnetic RE and TM sublattices that interact via antiferromagnetic exchange coupling. These amorphous ferromagnetic films exhibit large coercivity fields of several Tesla and moderate anisotropy energy $\sim 10^6$erg/cm. The magnetization of the sublattices compensates each other at the compensation temperature (T_{comp}). The spin structure and atomic-scale structure support ultrafast magnetic switching and ultra-small ~5-10 nm skyrmions. These materials are being studied for high-density ultrafast nanoelectronics. Self-exchange bias can be obtained by appropriately configuring the nanoscale structure. The mechanisms are verified by micromagnetic and atomistic simulations. Measurements include magnetization, MOKE, MFM, Hall effect, and magneto-resistance. The ability to control these new properties in amorphous films without the need for epitaxial growth could open a new avenue for enhancing the functionalities of spin-based materials.

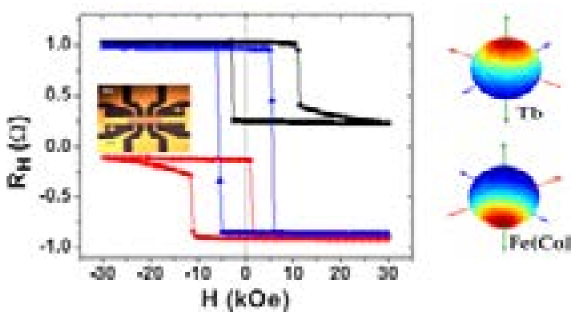


FIG: Hall resistance measurement of patterned a-TbFe amorphous film showing major and minor loops as well as exchange bias effect.
Right: Monte Carlo simulated Tb and Fe spin distributions around the north and south poles.

Biography

Joseph Poon is William Barton Rogers Professor of Physics at the University of Virginia. He received his BS and PhD from Caltech and was did postdoc work at Stanford University. He has published 200+ papers. His current research is on magnetic films and thermoelectric materials. He previously worked on metallic glasses and quasicrystals.

sjp9x@virginia.edu