

ISRAEL PHYSICAL SOCIETY

51st Annual Meeting
Physics Unit, Ort-Braude College
29th December, 2005

BULLETIN of the ISRAEL PHYSICAL SOCIETY
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Gad Eilam (Technion) - Particles and Nuclear Physics
Gregory Falkovich (Weizmann) - Statistical Physics
Elisha Haas (Bar-Ilan) - Biophysics
Mordehai Heiblum (Weizmann) - Condensed Matter Physics
Lior Klein (Bar-Ilan) - Strongly Correlated Electron Systems and Magnetism; Student Prizes
Konstantin Komoshvili (Judea-Samaria) - Plasma Physics
Gad Koren (Technion) - Superconductivity
Ehud Meron (Ben-Gurion) - Nonlinear Physics
David Mukamel (Weizmann) - Statistical Physics
Adi Nusser (Technion) - Astrophysics and Cosmology
Eli Raz (Ort-Braude) - Physics Education and History of Physics
Zvi Rosenstock (Rafael) - Physics in Industry

Additional Committee Members

Raoul Weil (Technion), Guy Tel-Zur (Negev NRC), Nir Davidson (Weizmann), Michael Gedalin (Ben-Gurion), Michael Savin (Teachers' representative)

The Israel Physical Society

The Israel Physical Society is a voluntary non-profit association which acts to stimulate research and education in physics. The organization is open to all physicists (not only from Israel), including students, and those who support research and education in physics. Any physicist, student of physics, or simply a person who supports research and education in physics can become a member, if he/she accepts the objectives of the IPS and pays his/her annual membership fee. This year we added two new corporate members - welcome ! We hope to add more “Michlalot” in the near future.

Membership in IPS allows you to participate in the symposia of the American Physical Society (APS), European Society (EPS), and Canadian Association of Physicists (CAP), with the registration fee at the rate of the corresponding society member. You can subscribe to the APS, EPS, and CAP journals at reduced rates. Membership in IPS also means a reduced direct membership in EPS with the right to participate in various committees.

By joining IPS you would help to improve the annual IPS meeting organization, support Israeli students and young scientists, and strengthen the physics community in Israel. This year we received our certificate from the Rasham Amutot stating that we are a legal organization. Some issues concerning our official name will be on the Business Meeting agenda at IPS2005 and we ask all members to attend this (short) discussion.

Welcome Message

ORT Braude College is pleased to welcome all participants of the 51st annual meeting of the Israel Physical Society. We are proud to host this meeting in our college, where the beautiful view of the Galilean landscape can be seen from our campus.

The greatest benefit of the IPS meeting is not the exchange of knowledge between researchers that share the same expertise, but rather the exchange of ideas between researchers from different fields, which can establish cooperation and thus open new avenues of investigation. The IPS promotes the young generation and provides a chance for research students to present their work. The students' prize ceremony at the beginning of the meeting indicates the importance that IPS relates to the researchers of tomorrow.

This is the first time that the IPS meeting takes place in a college. We hope that this is the first step towards an era of cooperation between researchers from universities and college physicists, who need and desire this cooperation as a means and a trigger for carrying out research. Research in colleges is a vital element for their successful performance and can promote their integration as a significant part of the academic community. Research in colleges contributes to their academic standard and has the potential to attract promising researchers to join and increase the research volume in our country. In the absence of government funds devoted to this purpose, the most efficient way to encourage research in colleges is by cooperation with universities. We hope that the Israel Physical Society will be a driving force in this process, which will contribute to the technological and scientific progress of our society.

We would like to thank Dr. Joan Adler, the President of the IPS, for her help and advice in organizing this meeting. Thanks to the president of ORT Braude College, Dr. Shmaryahu Rozner, and the vice president for academic affairs, Prof. Yohanan Arzi, for supporting the meeting. We would like to thank all the committees, who made every effort to create a fruitful meeting. We thank Prof. Lior Klein and the members of the Students Prize committee. Special thanks to Liz Yodim for editing the 165 abstracts, to Dr. Hagar Landsman for the abstract submission site and to Punisha Bogicevic for the online registration site.

We thank Tower Semiconductor LTD and Shulman Company for their support.

Eli Raz,

On behalf of the local organising committee

IPS STUDENT PRIZEWINNERS

YAIR SREBRO

Yair completed his army service in the Talpiot program and an M.Sc. at BGU in 2000. Since 2002 he has been a Ph.D. student at the Technion, under the supervision of Dov Levine. His project is entitled “Thermodynamic Analogies in Granular Materials”. He has received a student Wolf prize as well as five other awards and has some 16 manuscripts accepted and submitted.

Yair Srebro initiated and administered a successful graduate student seminar series at the Technion, and has been a popular and successful teaching assistant. He will be presenting a talk in the Statistical Physics session at IPS2005

ELI SLOUTSKIN

Eli completed his B.Sc. at BIU in 2000, and his M.Sc. at BIU in 2002. Since 2002 he has been a Ph.D. student at BIU, under the supervision of Moshe Deutsch. His project concerns the structure of thin liquid surfaces and nanometer-thin organic and other overlayers on such surfaces. He has been awarded both the Wolf and Clore Prizes and five other awards and has 20 manuscripts accepted and submitted. He has made many visits to the National Synchrotron Light Source at Brookhaven National Laboratory in the USA.

Eli Sloutskin has prepared a computerized laboratory instruction book and has instructed advanced courses. He will be presenting a talk in the Condensed Matter session at IPS2005.

09:00-18:00 **POSTERS** Building EF and Building M
 09:00-09:45 Registration and coffee Building EF

MORNING PLENARY SESSION: Auditorium EF

Chair – Joan Adler, Technion

09:45-09:55 Welcome - **Yohanan Arzi**,
 Vice President of the ORT-Braude College

09:55-10:10 Prize Ceremony for Physics Students
Yair Srebro, Technion
Eli Sloutskin, Bar-Ilan

Chair – Amnon Moalem, Ben-Gurion

10:10-10:55 **Jacob Bekenstein**, Hebrew University of Jerusalem
Dark matter or new gravitational physics?

11:00-13:00 **MORNING PARALLEL SESSIONS:**

ASTROPHYSICS AND COSMOLOGY .	Rm M308
CONDENSED MATTER PHYSICS	Rm M203
MEDICAL PHYSICS	Rm M301
NONLINEAR PHYSICS	Rm M202
PARTICLES AND NUCLEAR PHYSICS	Rm M210
PLASMA PHYSICS	Rm M302
QUANTUM OPTICS	Rm M303
STATISTICAL PHYSICS	Rm M208
SUPERCONDUCTIVITY	Rm M201

13:00-14:30 **POSTERS** Building EF and Building M

13:00-14:30 **LUNCH** Dining Room

AFTERNOON PLENARY SESSION: Auditorium EF

Chair - Eshel Ben-Jacob, Tel-Aviv

14:30-15:15 **Herbert Levine**, University of California, San Diego
*Making decisions in a noisy world - the intelligent
dynamics of biological cells*

15:15-15:30 Coffee and **POSTERS**

15:30-17:30 **AFTERNOON PARALLEL SESSIONS:**

ASTROPHYSICS AND COSMOLOGY	Rm M308
BIOPHYSICS	Rm M302
COMPUTATIONAL PHYSICS	Rm M209
CONDENSED MATTER PHYSICS	Rm M203
PARTICLES AND NUCLEAR PHYSICS	Rm M210
PHYSICS EDUCATION AND HISTORY OF PHYSICS	Rm M201
PHYSICS IN INDUSTRY.....	Rm M301
QUANTUM OPTICS	Rm M303
STATISTICAL PHYSICS	Rm M208
STRONGLY CORRELATED ELECTRON SYSTEMS AND MAGNETISM	Rm M202

17:45-18:30 IPS Business Meeting, followed by light meal VIP Hall

DISCUSSION ROOMS

Rooms M317 and M318 are available for all participants

ASTROPHYSICS AND COSMOLOGY: Rm M308

An additional session on this subject will be held in the afternoon, in the same room.

Chair – Adi Nusser, Technion

- 11:00-11:25 **Avishai Dekel**, Hebrew University of Jerusalem
The mystery of missing dark matter in elliptical galaxies
- 11:25-11:50 **Daniel Wolf Savin**, Columbia University, New York, NY
Cosmology in a can: Laboratory studies in atomic and molecular physics from high z to low Z
- 11:50-12:15 **Jean-Pierre Lasota**, Institut d'Astrophysique de Paris, CNRS, France
The origin and fate of black-hole binaries
- 12:15-12:40 **Assaf Horesh**, Tel Aviv University
The lensed arc production efficiency of galaxy clusters: a comparison of matched observed and simulated samples
- 12:40-13:05 **Ehud Nakar**, California Institute of Technology
The revolution in the understanding of short gamma-ray bursts: Implications for LIGO

CONDENSED MATTER PHYSICS: Rm M203

An additional session on this subject will be held in the afternoon, in the same room.

Chair – Mordehai Heiblum, Weizmann

- 11:00-11:30 **Amir Yacoby**, Weizmann Institute
Control and manipulation of single electron spins in GaAs quantum dots
- 11:30-12:00 **Ehud Altman**, Weizmann Institute
Superfluid-Insulator transition in a moving system of interacting bosons
- 12:00-12:20 **Dan Shahar**, Weizmann Institute
Disordered superconductors
- 12:20-12:40 **Nir Dahan**, Technion
Space-variant polarization manipulation of a thermal emission by quasi-periodic structures supporting surface phonon-polaritons
- 12:40-13:00 **Lahav Gan**, Technion
Quantization of 2D hole gas in conductive hydrogenated diamond surfaces observed by electron field emission

MEDICAL PHYSICS: M203

Chair – Solange Akselrod, Tel-Aviv

- 11:00-11:30 **Haim Azhari**, Tel-Aviv
MRI angiographic imaging without contrast materials
- 11:30-11:50 **Noam Ben Eliezer**, Tel Aviv University
A model of arterial blood flow applied to vasculature in the upper limb
- 11:50-12:10 **Ruty Kapun**, Weizmann Institute
Coordination of bi-directional traffic across nuclear pores
- 12:10-12:40 **Benjamin Ehrenberg**, Bar-Ilan University
Biophysical properties of membranes affect the topography and photophysical efficiency of sensitizers for photodynamic therapy
- 12:40-13:00 **Roi Kobo**, College of Judea and Samaria
Early signs of ventricular tachycardia

NONLINEAR PHYSICS: Rm M202

Chair – Ehud Meron, Ben-Gurion

- 11:00-11:25 **Itzhak Fouxon**, Hebrew University of Jerusalem
Anomalous scaling of passive scalar in equilibrium range
- 11:25-11:50 **Eran Bouchbinder**, Weizmann Institute
Multiscaling in fracture surfaces morphology
- 11:50-12:15 **Barak Freedman**, Technion
Nonlinear photonic quasicrystals
- 12:15-12:40 **Omri Gat**, Hebrew University of Jerusalem
Crossing the entropic barrier to pulsation in passively mode locked lasers
- 12:40-13:05 **Erez Gilad**, Ben-Gurion University
From competition to facilitation in mixed plant communities: The importance of spatial organization

PARTICLES AND NUCLEAR PHYSICS:Rm M210

An additional session on this subject will be held in the afternoon, in the same room.

Chair – Gad Eilam, Technion

- 11:00-11:40 **Marek Karliner**, Tel Aviv University
Pentaquark update
- 11:40-11:55 **Eyal Brodet**, Tel Aviv University
ZZ production in ATLAS
- 11:55-12:25 **Halina Abramowicz**, Tel Aviv University
The ILC: Purpose and prospects
- 12:25-13:05 **Eli Friedman**, Hebrew University of Jerusalem
Hadronic interactions in dense nuclear matter
- 13:05-13:20 **Lidija Zivkovic**, Weizmann Institute
 $t\bar{t}H \rightarrow t\bar{t}\tau\tau$ -toward the measurement of the top-Yukawa coupling

PLASMA PHYSICS:Rm M302

Chair – Konstantin Komoshvili, Judea-Samaria

- 11:00-11:30 **Amnon Fruchtman**, Holon Academic Institute of Technology
The electric field in a double layer and the imparted momentum
- 11:30-11:50 **Alon Grinenko**, Technion
High power electrical wire explosion in water
- 11:50-12:10 **Marcelo Schiffer**, College of Judea and Samaria
Sonoluminesce: Hot plasma versus inertial polarization
- 12:10-12:40 **Evgeny Gidalevich**, Tel Aviv University
Stationary arc discharge in a water stream
- 12:40-13:00 **Mordechai Hakham-Itzhaq**, College of Judea and Samaria
Optogalvanic spectroscopy of autoionization levels in plasma glow discharges

QUANTUM OPTICS:Rm M303

An additional session on this subject will be held in the afternoon, in the same room.

Chair – Shimshon Barad, Tel-Aviv

- 11:00-11:30 **Moshe Shuker**, Technion
Measuring and slowing decoherence in EIT medium
- 11:30-12:00 **N. Akopian**, Technion
Entangled photons from radiative cascades in semiconductor quantum dots
- 12:00-12:30 **G. Kurizki**, Weizmann
Was Zeno right after all?
- 12:30-12:50 **Eli Barkai**, Bar-Ilan University
Theory of single photon control from a two level system source
- 12:50-13:10 **Yuri Gorodetski**, Technion
Optical properties of polarization-dependent geometrical phase elements with partially polarized light

STATISTICAL PHYSICS:Rm M208

An additional session on this subject will be held in the afternoon, in the same room.

Chair – David Mukamel, Weizmann

- 11:00-11:25 **Joel Stavans**, Weizmann Institute
Fidelity of molecular processes in biology: The case of recombination
- 11:25-11:50 **Yariv Kafri**, Technion
Unzipping a Luttinger liquid
- 11:50-12:15 **Oleg Krichevsky**, Ben-Gurion University
Monomer dynamics in DNA and F-actin in constrained situations
- 12:15-12:40 **Yair Srebro**, Technion
Minimal modeling of driven dissipative systems
- 12:40-13:00 **Haim Taitelbaum**, Bar-Ilan University
Interface roughening dynamics of spreading droplets

SUPERCONDUCTIVITY:Rm M201

Chair – Gad Koren, Technion

- 11:00-11:20 **Beena Kalisky**, Bar-Ilan University
Revealing the vortex order-disorder phase transition in small $Bi_2Sr_2CaCu_2O_{8+\delta}$ crystals
- 11:20-11:40 **Itay Asulin**, Hebrew University of Jerusalem
Evidence for Crossed Andreev Reflections in $(100)YBa_2Cu_3O_{7-\delta}$ - $SrRuO_3$ superconductor-ferromagnet bilayers
- 11:40-12:00 **Eli Farber**, College of Judea and Samaria
Doping dependence of the pairing symmetry in $Y_{1-x}Ca_xBa_2Cu_3O_7$ thin films
- 12:00-12:20 **Haim Beidenkopf**, Weizmann Institute
Equilibrium first-order melting and second-order glass transitions of the vortex matter in $Bi_2Sr_2CaCu_2O_8$
- 12:20-12:40 **Pavel Aronov**, Technion
Signature of a crossed Andreev reflection effect (CARE) in YBCO/SrRuO₃/YBCO junctions
- 12:40-13:00 **Roy Beck**, Tel Aviv University
Tunneling into YBCO superconductor at high magnetic field

ASTROPHYSICS AND COSMOLOGY: Rm M308

Chair – Adi Nusser, Technion

- 15:30-15:55 **Noam Soker**, Technion
Understanding the flat minima of Eta Carinae
- 15:55-16:20 **Tal Alexander**, Weizmann Institute
Probing post-Newtonian physics and the distributed dark mass by stars near the Galactic black hole
- 16:20-16:45 **Smadar Naoz**, Tel Aviv University
Reconsidering galaxy formation at high redshift
- 16:45-17:10 **Raanan Nordon**, Technion
Large X-ray flares on active stars
- 17:10-17:35 **Hagai Perets**, Weizmann Institute
Star showers in the galactic center

BIOPHYSICS: Rm M302

Chair – Benny Eherenberg, Bar-Ilan

- 15:30-16:00 **Nathalie Questembert-Balaban**, Hebrew University of Jerusalem
Bacterial persistence in the light of microfluidics
- 16:00-16:30 **Yaron Shav-Tal**, Bar-Ilan University
Kinetic analysis of gene expression in single living cells
- 16:30-17:00 **Gilad Haran**, Weizmann Institute
The globule-to-coil transition in small protein: a single-molecule study
- 17:00-17:30 **Na'ama Brener**, Technion
A population view of gene regulation

COMPUTATIONAL PHYSICS:Rm M209

Chair – Joan Adler, Technion

- 15:30-16:10 **Dietrich Stauffer**, Cologne University, Germany
Competition between languages
- 16:10-16:30 **Tali Mutat**, Technion
Atomistic simulation of diffusion of hydrocarbons in carbon nanotubes
- 16:30-16:50 **Dan Mordehai**, Tel Aviv University
Non-planar core and dynamic emission of dislocations in fcc crystals
- 16:50-17:10 **Baruch Barzel**, Hebrew University of Jerusalem
Moment equations for complex chemical networks
- 17:10-17:30 **Tomer Kalisky**, Bar-Ilan University
Scaling of optimal path lengths distribution in complex networks

CONDENSED MATTER PHYSICS:Rm M203

Chair – Nir Dahan, Technion

- 15:30-16:00 **Ora Entin-Wohlman**, Ben Gurion University
ac Spin-Hall effect
- 16:00-16:30 **Dan Ritter**, Technion
High speed electronics, will 3-5 semiconductor devices survive?
- 16:30-16:50 **Alexander Palevski**, Tel Aviv University
Luttinger liquid behavior of weakly disordered quantum wires
- 16:50-17:10 **Oshri Pelleg**, Technion
Observation of macroscopic structural fluctuations in bcc solid ^4He
- 17:10-17:30 **Eli Sloutskin**, Bar-Ilan University
Ionic liquids:an x-ray reflectivity study

PARTICLES AND NUCLEAR PHYSICS: M210

Chair – Avraham Gal, Hebrew University

- 15:30-16:10 **Itzhak Tserruya**, Weizmann Institute
Relativistic heavy ion collisions: Highlights and perspectives
- 16:10-16:25 **Natalia Panikashvili**, Technion
Preparation for the study of Λ_b polarization in ATLAS
- 16:25-16:40 **Arie Melamed-Katz**, Weizmann Institute
WIMP detection by black hole production in ATLAS
- 16:40-17:30 **Giora Mikenberg**, Weizmann Institute
ATLAS: The largest experiment in particle physics

**PHYSICS EDUCATION
and HISTORY OF PHYSICS: Rm M201**

Chair – Eli Raz, Ort-Braude

- 15:30-16:00 **Elisha Cohen**, Technion
Learning physics
- 16:00-16:30 **Yehudit J. Dori**, Technion
The effect of technology-enabled active learning on undergraduate students understanding of electromagnetism
- 16:30-16:50 **Igal Galili**, Hebrew University of Jerusalem
Towards a theory of physics curriculum - teaching physics as a culture
- 16:50-17:10 **Zvi Paltiel**, Weizmann
MAGMADIM: Young Explainers Program
- 17:10-17:30 **Miron Ya Amusia**, Hebrew University of Jerusalem
Hundred years of the Einstein's theory of photoeffect

PHYSICS IN INDUSTRY: Rm M301

Chair – Zvi Rosenstock, Rafael

- 15:30-16:00 **Amnon Fisher**, Technion
Dense Z-pinch and thermonuclear fusion
- 16:00-16:30 **Yakov Roizin**, Tower Semiconductor Israel
Physical principles of novel discrete node storage nonvolatile memories
- 16:30-16:50 **Naor Wainer**, Philips Medical Systems
CT detection systems
- 16:50-17:10 **Shaul Raz**, Hewlett-Packard Company, Rehovot
HP-Indigo digital printing
- 17:10-17:30 **Pinchas Schechner**, ORT-Braude College, Karmiel
Fuel cells fuelled by saccharides

QUANTUM OPTICS: Rm M303

Chair – Shimshon Barad, Tel-Aviv

- 15:30-16:00 **Hagai Eisenberg**, Hebrew University of Jerusalem
Path entanglement of photons by non-local bunching
- 16:00-16:30 **Alex Retzker**, Tel Aviv University
Vacuum entanglement in an ion trap
- 16:30-16:50 **Alon Har-Tal**, Ben-Gurion University
Amplification without population inversion in a three level Λ system
- 16:50-17:10 **Yonatan Sivan**, Tel Aviv University
Propagation of pulses in a medium with a nonlinear microstructure
- 17:10-17:30 **Ron Folman**, Ben-Gurion University
The Atom Chip: manipulating ultra cold atoms next to room temperature surfaces

STATISTICAL PHYSICS: Rm M208

Chair – Gregory Falkovich, Weizmann

- 15:30-15:55 **Itzhak Goldhirsch**, Tel Aviv University
Frictional granular gases
- 15:55-16:20 **Eugene Kanziiper**, Holon Academic Institute of Technology
Ginibre's real random matrices: 40 years later
- 16:20-16:45 **Baruch Meerson**, Hebrew University of Jerusalem
Dynamics and statistics of clustering in a freely cooling granular gas
- 16:45-17:10 **Yacov Kantor**, Tel Aviv University
Knots in polymers
- 17:10-17:30 **Eli Barkai**, Bar-Ilan University
Weak ergodicity breaking in blinking quantum dots and other fractal time systems

STRONGLY CORRELATED ELECTRON SYSTEMS and MAGNETISM: Rm M202

Chair – Lior Klein, Bar-Ilan

- 15:30-16:00 **Amit Keren**, Technion
Charge-inhomogeneity doping relations in correlated electron system detected by Angle Dependent Nuclear Quadrupole Resonance
- 16:00-16:20 **Moshe Shechter**, University of British Columbia
 $LiHo_xY_{1-x}F_4$ and the quantum Ising spin glass
- 16:20-16:40 **Yosi Bason**, Bar-Ilan University
Planar-Hall-Effect MRAM
- 16:40-17:10 **Alexander Gerber**, Tel Aviv University
Towards Hall effect spintronics
- 17:10-17:30 **Yakov Strelniker**, Bar-Ilan University
Superconductor-insulator transition in granular films