2011 14th International Symposium on Electrets

(ISE 2011)

Montpellier, France
28-31 August 2011
# SYMPOSIUM ORAL PROGRAMME

## MONDAY 29 AUGUST

- **08H00-09H00: REGISTRATION**
- **OPENING SESSION** (Chair: F. Henn)

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- **SESSION 1** (Chair: C. Lacabanne)

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<td>N. Balcon, SupElec, France</td>
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• **SESSION 3** (Chair: T. Furukawa)

15h30-15h55  Keynote lecture (invited) - S. J. Kang, Y. J. Park and C. Park  
Yonsei Univ., Korea  
*Nonvolatile Ferroelectric Polymer Memory with Controlled Hierarchical Nanostructures*

15h55-16h10  Oral Presentation - C. David, J-F. Capsal, E. Dantras and C. Lacabanne  
Univ. Toulouse, France  
*Electroactive Properties of Polyamide/Sodium Niobate Nanowires Composites*

Darmstadt Univ. Tech., Germany  
*Theoretical Considerations Towards an Optimal d33-Coefficient of Sandwiched Piezoelectrets*

16h25-16h40  Oral Presentation - R. Hanna, T. Paulmier, M. Belhaj, P. Molinié, B. Dirassen, D. Payan and N. Balcon  
ONERA and CNES, France  
*Characterization of Electrical Transverse Conductivity of Space Dielectric Materials*

Tongji Univ., China  
*Investigation into Polarization and Piezoelectricity in Polymer Films with Artificial Void Structure*

17h00-17h30  Tea break

• **SESSION 4** (Chair: M. Wübbenhorst)

17h30-17h55  Keynote lecture (invited) - S. Bauer,  
Johannes Kepler Univ., Austria  
*Polymer Electrets in Flexible Electronics*

17h55-18h10  Oral Presentation - J. Hillenbrand, S. Haberzettl and G. M. Sessler  
Darmstadt Univ. Tech., Germany  
*Close-talking piezoelectret microphone-arrays*

18h10-18h25  Oral Presentation - J. Sworakowski, P. Lutsyk, K. Janus, G. Generali, R. Capelli, M. Muccini, A. Kochalska and S. Nešpůrek  
Wroclaw Univ. Tech, Poland  
*Photoswitchable OFETs Controlled by Optical Bistability in the Dielectric Layer*

18h25-18h40  Oral Presentation - F. Galantini, G. Gallone, F. Carpi, G. Levita and D. De Rossi  
Univ. Pisa, Italy  
*Soft Elastomeric Electrets for Electro-Active Polymers*

Nat. Taiwan Univ., Taiwan  
*Tailoring the Performance of Flexible Loudspeakers by Varying Cell Actuator Formation*

19h00-19h15  **GROUP PHOTO**

• **19h00 – 21H00: POSTER SESSION – EVEN NUMBERS** - (Chair: T. Furukawa, F. Henn & Q. Zhang)

DINNER AT THE SYMPOSIUM VENUE
**Tuesday 30 August**

- **Session 5** (Chair: R. Fleming)
  
  9h00-9h25  
  **Keynote lecture (invited)** - **S. Holé**  
  Ecole Sup. Phys. Chim. Industrielles, Paris, France  
  *Behind Space Charge Distribution Measurements*  
  
  9h25-9h40  
  Oral Presentation - **P.V. Menezes**, **J. Martin**, **M. Schäfer** and **K.M. Weitzel**  
  Philipps-Univ. Marburg, Germany  
  *Bombardment Induced Ion Transport Through an Ion-conducting Ca30 glass*  
  
  9h40-9h55  
  Oral Presentation - **T. Tran-Anh**, **L. Berquez**, **L. Boudou** and **J. Martinez-Vega**  
  Univ. Toulouse, France  
  *Space Charge and Induced Mechanical Deformation Cartographies by FLIMM and Digital Image Correlation on Electron Irradiated PTFE Thin Film*  
  
  9h55-10h10  
  Oral Presentation - **B. Martin**, **A. Ostrovskiy** and **H. Kliem**  
  Saarlands Univ., Germany  
  *Surface Charging of Silicon Dioxide/Silicon Structures*  
  
  10h10-10h25  
  Oral Presentation - **V. Leonov**, **M. Goedbloed**, **R. Van Schaijk** and **C. Van Hoof**  
  IMEC, Leuven, Belgium  
  *Comparison of Positively and Negatively Charged Layered Inorganic Electrets for High Operational Temperatures*  
  
  10h25-10h40  
  Oral Presentation - **T. Furukawa** and **H. Kodama**  
  Kobayasi Inst. of Phys. Research, Japan  
  *Piezoelectric, Pyroelectric and Ferroelectric Polymers as a Functional Soft Matter*  
  
  10h40-11h10  
  Coffee break  

- **Session 6** (Chair: Prof. S. Lang)
  
  11h10-11h35  
  Keynote lecture (invited) - **R. Sundararajan**, **R. P. Ramachandran** and **K. Sankaranarayanan**  
  Purdue Univ., USA  
  *Efficient, Electrically-Enhanced Proliferation Control of Adult Human Mesenchymal Stem cells*  
  
  11h35-11h50  
  Nat. Tech. Univ. Athens, Greece  
  *Water and Protein Dynamics in Protein – Water Mixtures over Wide Ranges of Composition*  
  
  11h50-12h05  
  Second Military Medical University Shangai, China  
  *Penetration of Surface Potential of Electret through Skin and its Stability*  
  
  12h05-12h20  
  Ecole Polytechnique de Montreal, Canada  
  *Adhesion of U937 monocytes on polymer surfaces: Chemistry or electrostatics?*  
  
  12h20-12h35  
  Univ. Nova Lisboa, Portugal  
  *Influence of Polarization on the Bioactivity of Nanopowders of Hydroxyapatite*  
  
  12h35-12h50  
  Oral Presentation - **D. V. Nordheim**, **S. Hahne** and **B. Ploss**  
  Univ. App. Sciences Jena, Germany  
  *Nonlinear Dielectric Properties and Polarization in Ferroelectric P(VDF-TrFE) Copolymer Thin Films*  

-VIII-
• 13h00-15h00: POSTER SESSION – ODD NUMBERS - (Chair: T. Furukawa, F. Henn & Q. Zhang)
  Lunch at the symposium venue

• 15h00-17h00: TOURISTIC TOURS

• 19h00: DEPARTURE TO CONFERENCE DINNER

• 20h00 – 23h00: SYMPOSIUM DINNER
### SESSION 7 (Chair: F. Bauer)

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<td>Univ. Ulsan, Korea</td>
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<td>Univ. Caen-Basse Normandie, France</td>
<td>Thermal Waves Interferences For Space Charge Measurements In Dielectrics</td>
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<td>Tongji Univ., China</td>
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10h30-11h00 Coffee break

### SESSION 8 (Chair: X. Zhang)

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<td>Hindustan College of Science and Technology, India</td>
<td>Investigation of optical and thermally stimulated electrical properties of polar polymer nanocomposites</td>
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<td>Asahi Glass Co., Japan</td>
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  General Electric, Niskayuna, USA
  *Inverse Problems in Dielectrics* |
| 14h25-14h40 | 9       | Oral Presentation - **P. Frübing**, F. Wang, M. Wegener and R. Gerhard
  Potsdam Univ., Germany
  *Peculiarities of the Dielectric and Dynamic-Mechanical Response in Poly(vinylidene fluoride - hexafluoropropylene)* |
| 14h40-14h55 | 9       | Oral Presentation - **A. Prasad Raju**, J. Amarnath, D. Subbarayudu and M. Ramesh Reddy
  Sree Chaitanya College of Engineering, Karimnagar, India
  *First Order Derivative Computation of Jacobian Matrices in Load Flow Algorithms using Automatic Differentiation* |
| 14h55-15h10 | 9       | Oral Presentation - S. Harris, O. Mellinger and **A. Mellinger**
  Central Michigan Univ., Mount Pleasant, USA
  *Simulation of Space Charge Deposition by Barrier Discharges in Piezoelectric Polymer Foams* |
| 15h15-15h45 | 9       | Tea break |
| 15h45-16h05 | 10      | Keynote lecture (invited) - **L. Macqueen**, M. Thibault, M. D. Buschmann and M. R. Wertheimer
  Ecole Polytechnique de Montreal, Canada
  *Electro-Mechanical Manipulation of Mammalian Cells in Suspension* |
  Ben-Gurion Univ., Israel
  *Pyroelectric, piezoelectric and photoeffects in hydroxyapatite thin films on silicon* |
| 16h20-16h35 | 10      | Oral Presentation - **K. Yamashita**, N. Horiuchi, N. Wada, M. Nakamura and A. Nagai
  Tokyo Medical and Dental University, Japan
  *Fundamentals and Applications of Bioceramic Electrets* |
| 16h35-16h50 | 10      | Oral Presentation - **S.A.M. Tofail**, Y. Zhang and A.A. Gandhi
  Univ. Limerick, Ireland
  *Piezoelectricity of bone from a new perspective* |
| 16h50-17h30 |         | **Closing Session** (Chair. Prof. F. Henn)                                                                                                           |
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**POSTER PROGRAMME**

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National Taiwan University, Taipei, Taiwan  
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ETSEIAT, Terrassa, Spain  
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| P1-5      | **G.C. Faria**, R.M. Faria, E.R deAzevedo and H. von Seggern  
University of São Paulo, São Carlos, Brazil – Technical University of Darmstadt, Germany  
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University of São Paulo, São Carlos, Brazil  
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| P1-8      | **R. Khazaka**, M-L. Locatelli and S. Diaham  
University of Toulouse and CNRS, Toulouse, France  
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Departement DESP/ONERA, Toulouse, France  
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University of Potsdam, Potsdam, Germany  
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| P1-12     | **L. Salles**, J.M. Reboul, D. Busardo and B. Boudart  
University of Caen, Cherbourg, France  
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| P1-13     | **A. Viraneva**, T. Yovcheva, St. Nedev, M. Hristov and G. Mekishev  
Plovdiv University, Plovdiv, Bulgaria  
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<td>Z. Xu, M. Reading, A. S. Vaughan and P. L. Lewin</td>
<td>University of Southampton, Southampton, UK.</td>
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**TOPIC 2: Thermally Stimulated Current and dielectric Relaxation**

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<td>Dublin Institute of Technology, Dublin, Ireland - University of Limerick, Limerick, Ireland</td>
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**P2-8**
D. Jain, L. S. Sharath Chandra, V. Ganesan and **R. Nath**
UGC-DAE Consortium for Scientific Research, Indore (MP), India
*Bioelectret state in Aromatic Amino Acids: a Thermally Stimulated Depolarization Current study of Phenylalanine, Tyrosine and Tryptophan*

**P2-9**
FCT, University of Nova de Lisboa, Caparica, Portugal - Technical University of Iasi, , Iasi, Romania
*Discrimination between Space Charge and Dipolar Contributions in Ferroelectric Polymers*

**P2-10**
**J.K. Quamara**, P. Raj, S.K. Mahna and S. Lal
National institute of Technology, Kurukshetra, India
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**TOPIC 3: Nanoscale Measurements of Electrostatic Phenomena**

**P3-1**
**F. Emmerich** and C. Thielemann
University of Applied Sciences Aschaffenburg, Germany
*Observation of Thermal Discharge in Nanopatterned Electrets by Kelvin-Probe-Microscopy*

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**TOPIC 4: Electret Phenomena in Nanocomposite Materials**

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**M.F. Galikhanov** and I.A. Zhigaeva
Kazan State technological university, Kazan, Tatarstan, Russia
*Changes of Polyethylene Electret Properties when Filled with Barium Titanate*

**P4-4**
**Y. Ishibashi, R. Hanaoka**, S. Takata, Y. Kanamaru and H. Anzai
Kanazawa Institute of Technology, Ishikawa, Japan
*Properties of Epoxy Resin Composite Containing CNTs Dispersed by Barrier Discharge*

**P4-7**
**Y. Zhuang**, J. Zha and G. Chen
University of Southampton, Southampton, United Kingdom
*Surface Potential Decay and dc Conductivity of TiO2-based Polyimide Nanocomposite Films*

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**TOPIC 5: Ferro, Piezo and Pyroelectric Phenomena**

**P5-1**
Institute of Physics NASU, Kyiv, Ukraine
*Pyroelectric Thermal Wave Probing and Pyroelectric Resonance – Antiresonance Phenomena in Polar Polymer Films of PVDF Family*

**P5-2**
**P. Combette**, A. Garaud, B. Charlot and A. Giani
Institut d'Electronique du Sud, Université Montpellier 2, Montpellier, France
*A New Thermal Accelerometer Based on Pyroelectric Thin Films*

**P5-3**
**T. Mahfoud**, G. Molnar, **P. Demont**, L. Salmon and A. Bousseksou
University of Toulouse, Toulouse, France
*Ferro-paraelectric Transition and Thermal Hysteresis Loop of Dielectric Permittivity in Charge Transfer Complex*
H. Kodama, T. Osawa, Y. Yasuno and T. Furukawa
Kobayasi Institute of Physical Research, Tokyo, Japan
A Series of Electromechanical Measurements for Determination of Piezoelectric, Dielectric and Elastic Tensor Components in Porous Polypropylene Electrets

N. Marroquin Jacobs, X. Qiu, R. Gerhard
Influence of Thermal Treatment on the Electrical and Electromechanical Properties of Cellular Polypropylene Ferroelectrets

S. Aryal and A. Mellinger
Central Michigan University, Mount Pleasant, USA.
Towards a three-dimensional Analysis of Polarization Profiles in Electret Materials with Thermal Methods

T. Nakajima, Y. Mabuchi, T. Morimoto, T. Furukawa and S. Okamura
Tokyo University of Science, Tokyo, Japan
Ferroelectricity in Ultrathin Films of Polyvinylidene Fluoride and its Copolymer

J. Schütrumpf, S. Zhukov, Y.A. Genenko and H. Von Seggern
Technical University of Darmstadt, Darmstadt, Germany.
Polarisation Switching Dynamics by Inhomogeneous Field Mechanism in Ferroelectric Polymers

X. Zhang, D. Pan, Z. Xia and Y. Zhang
Tongji University, Shanghai, China - Xi’an Jiaotong University, Shaanxi, China
Piezoelectric Activity in Cross-linked Polypropylene Films Stretched at Elevated Temperature

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TOPIC 6: Electrostatic and Dielectric Phenomena in Life Science/Bioelectrets

F. Roig, E. Dantras, J. Grima-Pettenati and C. Lacabanne
University of Toulouse, Toulouse, France
Thermo Stimulated Currents a method to identify gene mutation in Arabidopsis Thaliana

N. Ichikawa, and S. Takei
Kogakuin University, Tokyo, Japan
Change in Electrostatically Induced Voltages of an Ungrounded Metal Box without Openings Generated by a Moving Charged Object

L. Cui, Y. Liang, F. Dong, H. Liu and J. Jiang
Second Military Medical University, Shanghai, China
Thermal analysis for studies of electret states of rat skin

Ben-Gurion University of the Negev, Beer Sheva, Israel
Poled PVDF-TrFE Coatings on Quartz Microbalance Sensors: A New Technique for Study of Proteins in Solution

M. Nakamura, A. Nagai and K. Yamashita
Tokyo Medical and Dental University, Tokyo, Japan
Surface Electric Fields of Apatite Electret Promote Biological Responses

V. Samouillan, D. Tintar, F. Delaunay, J. Dandurand and C. Lacabanne
University of Toulouse, Toulouse, France
Scanning of hydrogen bonds dynamics in hydrated fibrous proteins by dielectric spectroscopies

M. Wübbenhorst, T. Putzeys, M. Burgener and J. Hulliger
Department of Physics and Astronomy, K.U. Leuven, Leuven, Belgium
A High Sensitivity Scanning Pyroelectric Microscope using Interdigitated Comb-electrodes and Advanced Image Processing

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# TOPIC 7: Non-linear Electrical and Optical Effects, Photoelectret

**P7-1**  
**R. D’souza**, J.M. Keller and K. Das  
Rani Durgavati University, Jabalpur, India  
*Optical Properties of Iodine-PMMA Composites*

**P7-2**  
**N. Kozhevnikova**, P. Frübing, A. Mellinger and R. Gerhard  
University of Potsdam, Potsdam, Germany  
*Thermally and Optically Stimulated Discharge Phenomena in Dye-doped Cyclic Olefin Copolymers*

**P7-3**  
**W.-P. Lin** and **Y.-F. Hsu**  
Chang Gung University, Tao Yunan, Taiwan  
*All Optical NOR Gates Implemented by 2-D PhotonicCrystals*

**P7-4**  
**P. Nagabhushan**, J. Amarnath and D. Subbarayudu  
P.D.A College of Engineering, Gulbarga, Karnataka, India  
*Insulation integrity of Metallic Particles in a Gas Insulated Busduct using SF6 and N2 Gas Mixture under the influence of Power frequency and Impulse Voltages*

**P7-5**  
**M.R. Rao** and J. Amarnath  
V.R.Siddhartha Engineering College, Vijayawada, India  
*Metallic Particle Behavior in a Gas Insulated Busduct with SF6/N2 Gas Mixture*

**P7-6**  
**N. Rama Rao** and J. Amarnath  
Nigama Engineering College, Karim Nagar, India  
*Effect of Various Parameters on Electric Field Calculation in 1-Φ Gas Insulation Busduct Using Charge simulation Method*

# TOPIC 8: Application of Thin Film Ferroelectrets

**P8-1**  
**A. Kogler**, G. Buchberger, R. Schwödiauer and **S. Bauer**  
Johannes Kepler University, Linz, Austria  
*Ferroelectret based Flexible Keyboards and Tactile Sensors*

**P8-2**  
**J. Hillenbrand**, S. Haberzettl, T. Motz, and **G. M. Sessler**  
University of Technology, Darmstadt, Germany  
*Voltage sensitivity of electret- and piezoelectret-accelerometers*

**P8-3**  
**L. Holländer**, W. Wirges and R. Gerhard  
University of Potsdam, Potsdam, Germany  
*Remanent Alignment of a Nematic Liquid Crystal Dispersed in Electrically Poled Poly(Vinylidenefluoride-Trifluoroethylene)*

**P8-4**  
**R. Kalbitz**, P. Frübing, R. Gerhard, D. M. Taylor  
P.D.A College of Engineering, Gulbarga, Karnataka, India  
*Organic Non-volatile Memory Devices Based on a Ferroelectric Polymer*

**P8-5**  
**X. Qiu**, W. Wirges and R. Gerhard  
University of Potsdam, Potsdam, Germany  
*Plasma Modification of the Internal Polymer Surfaces and Polarization Fatigue in Cellular-Polypropylene Ferroelectrets*
### TOPIC 9: Electrets in Organic Electronics

| P9-1 | R. H. Kim, S. J. Kang and C. Park  
Yonsei University, Seodaemun-gu, Seoul  
*Ferroelectric Polarization in Poly(vinylidene fluoride–chlorotrifluoroethylene) Thin Films and Non-volatile Ferroelectric Memory with Oligothiophene Single-Crystal* |

### TOPIC 10: Soft Actuators & Sensors

University of São Paulo, São Carlos, Brazil  
*A Comparison of Polymer Piezelectrets with Open and Closed Tabular Channels: Pressure Dependence, Resonance Frequency, and Behavior under Humidity* |
| P10-2 | Y.-T. Chiu, C.-T. Chen, Y.-C. Chang and J.-T. Yeh  
Industrial Technology Research Institute, Hsinchu, Taiwan.  
*A Transparent Electrets Loudspeaker for a LCD Monitor* |
| P10-3 | R. Hanaoka, K. Kuge, S. Takata, Y. Kanamaru and T. Fukami  
Kanazawa Institute of Technology, Ishikawa, Japan.  
*Properties of Pressure Reinforced Compact EHD Pump* |
National Taiwan University, Taipei, Taiwan  
*Study on free-Form Electret Actuators and its Applications* |
| P10-5 | S. Zhukov, H. von Seggern and S. Fedosov  
Darmstadt University of Technology, Darmstadt, Germany  
*Optimization of the Porous Polytetrafluoroethylene Sandwiches for Piezoelectric Applications* |
| P10-6 | Y. Yasuno, H. Kodama, M. Date and T. Furukawa  
Kobayasi Institute of Physical Research, Tokyo, Japan  
*Electro-acoustic Transducers with Cellular Polymer Electrets* |
WORKSHOP PROGRAMME

**SATURDAY 27 AUGUST**

- **09H00- 09H20: REGISTRATION**
- **MORNING SESSION**

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<td>9h30-10h15</td>
<td>V. Samouillan, J. Dandurand, D. Tintar, F. Delaunay and <strong>C. Lacabanne</strong> University of Toulouse, Toulouse, France</td>
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<td>Relaxations in Biological Tissues as a Function of Physiology and Pathology</td>
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<td><strong>L. A. MacQueen</strong>, M. Thibault, M. D. Buschmann and M. R. Wertheimer Ecole Polytechnique de Montreal, Montreal, Canada</td>
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<td>Electric-field-based Methods for the Manipulation and Modification of Biological Cells in Suspension</td>
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<td>11h30-12h15</td>
<td><strong>S. Bauer</strong> Johannes Kepler University, Linz, Austria</td>
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<td>Electrets for Biomedical Applications</td>
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<td><strong>R. Sundararajan</strong>, T. Salameh, I. Camarillo and L. Campana Purdue University, IN, USA</td>
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<td>Effective Use of Electrical Pulses on Cancer Cells to Control Proliferation</td>
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- **AFTERNOON SESSION**

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