Quantum Field Theory Under the Influence of External Conditions
$\mathcal{Q}$FE$\mathcal{X}$T$_{03}$
University of Oklahoma, Norman
September 15–19, 2003
Revised Schedule of Talks

September 16, 2003

Sunday, September 14

5:00–8:00pm Registration at Forum Building

Monday, September 15

7:30–9:00 Registration

9:00–9:30 Welcome: Milton, Doezema, Williams, Mergler

- Experimental Tests of the Casimir Effect I, Chair: *Bordag*

9:30–10:00 Stephen Lamoreaux, LANL, "A Demonstration of the Casimir Force with a Torsion Pendulum"

10:00–10:30 Umar Mohideen, Riverside, "Measuring the Casimir Force Using the Atomic Force Microscope"

10:30–11:00 *Coffee Break*

- Experimental Tests of the Casimir Effect II, Chair: *Mostepanenko*

11:00–11:30 Davide Iannuzzi, Harvard, "New Challenges and Directions in Casimir Force Experiments"

11:30–12:00 Roberto Onofrio, LANL/Padova, "Casimir Effects in a Parallel Plane Geometry"

12:00–12:30 Ricardo S. Decca, Indiana/Purdue, "Why Do We Need a Precise Measurement of the Casimir Force?: Its Influence in the Search for New Forces in the Submicron Range"

12:30–2:00 *Lunch*

- Effective Actions and Quantization, Chair: *Geyer*

2:00–2:30 Gerald Dunne, Connecticut, "Self-Duality, Helicity, and Higher-loop Euler-Heisenberg Effective Actions"

2:30–3:00 Joseph Buchbinder, Tomsk SPU, "Low-Energy Effective Action in $\mathcal{N} = 4$ Supersymmetric Yang-Mills Theory"

3:00–3:30 Michael Fry, Trinity College, Dublin, "Fermion Determinant for General Background Gauge Fields"

3:30–4:00 *Coffee Break*

- Field Theory in Background Configurations, Chair: *Buchbinder*

4:00–4:30 Alexei Abrikosov, Jr., ITEP, "Fermion States in the Spectral Bag"

4:30–5:00 Vasilka Sopova, Tufts, "The Electromagnetic Field Stress Tensor Near Dielectric Half-Spaces"

6:30 *Reception at Sam Noble Museum of Natural History*

Tuesday, September 16

- Casimir Forces Between Real Materials, Chair: *Mohideen*

9:00–9:30 Dennis Krause, Wabash, "Searching for New Forces and Extra Dimensions Using Casimir Force Experiments"

9:30–10:00 Kimball Milton, OU, "Perspectives on the Temperature Dependence of the Casimir Force Between Real Metals"

10:00–10:30 Vladimir Mostepanenko, St. Petersburg/Paraiba, "Two Approaches to the Casimir Free Energy: The Fluctuating Field and the Impedance Boundary Conditions"

10:30–11:00 *Coffee Break*

- Casimir Forces Between Real Metals, Including Temperature Effects, Chair: *Sernelius*

11:00–11:30 Iver Brevik, NUST, Trondheim, "Temperature Dependence of the Casimir Force Between Parallel Plates"

11:30–12:00 Galina Klimchitskaya, Paraiba, Brazil, "Impedance Approach Solves the Problems with the Thermal Casimir Force Between Real Metals"

12:00–12:30 Vitaly B. Svetovoy, Twente, NL, "Uncertainties in the Theoretical Prediction of the Casimir Force Between Real Metals"

12:30–2:00 *Lunch*

- Casimir and Molecular Forces, Chair: *Brevik*

2:00–2:30 Bo Sernelius, Linköping, Sweden, "van der Waals and Casimir Forces Between Metals at Finite Temperature and the Nernst Heat Theorem"

2:30–3:00 Thorsten Emig, Köln, "Toward a Theory of Molecular Forces Between Deformed Media"

3:00–3:30 Irina Pirozhenko, JINR, "Heat Kernel Expansion for Electromagnetic Fields Interacting with a Dielectric Body of Arbitrary Form"

3:30–4:00 *Coffee Break*

- Green's Functions and Functional Determinants, Chair: *Dunne*

4:00–4:30 Giampiero Esposito, Napoli, "Photon Green's Function in Curved Space-Time"

4:30–5:00 Klaus Kirsten, Baylor, "Functional Determinants in the Presence of Zero Modes"

5:00–5:30 Ralf Hofmann, Heidelberg, "Supersymmetric Models for Gauge Inflation"

Wednesday, September 17

- Quantum Effects in Nontrivial Backgrounds, Chair: *Milton*

9:00–9:30 Robert Jaffe, MIT, "Unnatural Acts: Unphysical Consequences of Imposing Boundary Conditions in Quantum Field Theory"

9:30–10:00 Michael Bordag, Leipzig, "Vacuum Polarization in the Background of String-Like Configurations"

10:00–10:30 Peter van Nieuwenhuizen, Stony Brook, "Anomalies in the Casimir Calculation and the Central Charge of the SUSY Kink and the SUSY Vortex"

10:30–11:00 *Coffee Break*

- Casimir Energies in the Light of Quantum Field Theory, Chair: *Jaffe*

11:00–11:30 M. Quandt, Tübingen, "Calculating Casimir Energies in Renormalizable Quantum Field Theory"

11:30–12:00 Herbert Weigel, Siegen, "Dirichlet Spheres in Continuum Quantum Field Theory"

12:00–12:30 Laurent Moyaerts, Tübingen, "Casimir Effect on the Worldline"

12:30–2:00 *Lunch*

- Solitons, Temperature Effects, and Anomalies, Chair: *van Nieuwenhuizen*

2:00–2:30 Lai-Him Chan, LSU, "A Novel Method to Calculate the Casimir Energies of Solitons and External Fields in Quantum Field Theory"

2:30–3:00 Vishesh Khemani, MIT, "Quantum Solitons in the Standard Model"

3:00–3:30 Emil Mottola, LANL, "Dark Energy and Condensate Stars: Casimir Energy in the Large"

3:30–4:00 *Coffee Break*

- Field Theory and Condensed Matter Physics, Chair: *Mullen*

4:00–4:30 Kenzo Ishikawa, Hakkaido, “Field Theory of Anisotropic Quantum Hall Gas”

4:30–5:00 Marcus Benghi Pinto, Santa Catarina, “Analytical Nonperturbative Evaluation of ΔT_c for Homogeneous Bose Gases”

5:00–5:30 Dmitri Fursaev, JINR, “Spectral Geometry of Operator Polynomials and Application to Quantum Field Theory”

6:30 *Cash bar*

7:00 *Banquet at Commons Restaurant*

Thursday, September 18

- Casimir and van der Waals Forces, Chair: *Mottola*

9:00–9:30 Bei-Lok Hu, Maryland, "Moving Atom-Field Interactions: Quantum Entanglement and Coherent Back-Reaction"

9:30–10:00 Larry Ford, Tufts, "Casimir Forces on Small Metal Spheres Near a Dielectric Interface"

10:00–10:30 Stephen Fulling, Texas A&M, "Vacuum Energy and Closed Orbit Theory"

10:30–11:00 *Coffee Break*

- New Aspects of Casimir Forces, Chair: *Fulling*

11:00–11:30 Barry Ninham, Florence/Regensberg, "Casimir Revisited Again"

11:30–12:00 Israel Klich, Technion, "On the Problem of Repulsive Casimir Forces"

12:00–12:30 Raul Esquivel-Sirvent, UNAM, "Spatial Dispersion Effects in Casimir Forces"

12:30–2:00 *Lunch*

- Casimir Energies in Other Configurations, Chair: *Ford*

2:00–2:30 Francisco Diego Mazzitelli, Buenos Aires, "Casimir Interaction Between Concentric Cylinders: Exact Versus Approximate Results"

2:30–3:00 Cecelia Noguez, UNAM, "Spectral Representation of the Casimir Force Between a Sphere and a Substrate"

3:00–3:30 Stefan Michalski, Dortmund, "$O(N)$ Linear Sigma Model Beyond the Hartree Approximation"

3:30–4:00 *Coffee Break*

- External Field Effects, Chair:

4:00–4:30 Norman Horing, Stevens Tech, “External Magnetic Field Effects on van der Waals Atom-Surface Interactions”

4:30–5:00 Bodo Geyer, Leipzig, “Reduction to Canonical Form of Arbitrary Euler-Lagrange Equations, Including Generic External Fields, and Derivation of Gauge Symmetries”

5:00–5:30 David Owen, Ioannina/Ben Gurion, “Bound States of a Spin-1 Particle in an Electromagnetic Field”

Friday, September 19

- Cosmology and Astrophysics, Chair: *Wang*

9:00–9:30 Emilio Elizalde, Barcelona, "Cosmological Uses of Casimir Energy"

9:30–10:00 Richard Woodard, Florida, "Quantum Effects During Inflation"

10:00–10:30 John Moffat, Toronto, "Cosmological Constant Problem and Proposed Eötvös Satellite Test of Zero-Point Vacuum Energy"

10:30–11:00 *Coffee Break*

- Quantum Mechanics and General Relativity, Chair:

11:00–11:30 Noah Graham, Middlebury, "Do Casimir Energies Obey General Relativity Energy Conditions?"

11:30–12:00 Oleg Zaslavskii, Kharkov, "Exact Solutions in $2D$ Dilaton Gravity Theories and Extremal Black Holes"

12:00–12:30 Floyd Williams, U. Mass, "Remarks on Nonlinear σ Fields and Gravity"

12:30–2:00 *Lunch*

- Nuclear Physics, Chair: *Zaslavskii*

2:00–2:30 Oliver Manuel, Missouri–Rolla, "Nuclear Clustering and Interactions Between Nucleons"

2:30–3:00 Santosh Karn, New Delhi, "Role of Diquarks in the QCD Phase Transition and Its Astrophysical and Cosmological Implications"

3:30–4:00 *Coffee Break*

- Higher Dimensions, Chair: *Graham*

4:00–4:30 Demian Cho, Wisconsin-Milwaukee, "Stationary Kaluza-Klein States in a Minisuperspace Framework"

4:30–5:00 Antonino Flachi, IFAE, Spain, "Quantum Effects in Higher-Dimensional Brane-World Models"

5:00–5:30 Kim Milton, OU, Closing Remarks