

Contents

Opening Addresses	S. NAKAJIMA	1
	Y. TAKEDA	2
Neutron Interferometry		
Quantum Measurements in Neutron Interferometry	H. RAUCH	3
A “Haunted” Version of the Einstein-Podolsky-Rosen Experiment	Daniel M. GREENBERGER and Allaine YASIN	18
Single-Atom Effect and Delayed Choice Experiment		
Single-Atom and Single-Photon Experiments	W. SCHLEICH and H. WALTHER	25
Results of the Delayed-Random-Choice Quantum Mechanics Experiment with Light Quanta and Proposal of a New Type of EPR Experiment Using Light Quanta Produced by a Nonlinear Optical Process		
<i>Part 1. The Delayed-Random-Choice Experiment</i>		
	C. O. ALLEY, O. G. JAKUBOWICZ and W. C. WICKES	36
<i>Part 2. A New Type of EPR Experiment</i>	C. O. ALLEY and Y. H. SHIH	47
Quantum Logical Analysis of Delayed-Choice Experiments	Peter MITTELSTAEDT	53
Two-Photon Correlation		
The Two-Photon Polarisation Correlation of Metastable Hydrogen as Test between Quantum Mechanics and Local Realistic Theories	Hans KLEINPOPPEN	59
Stochastic Optics: a Classical Wave Theory of Light Giving Particle-Like Properties		
	Trevor MARSHALL and Emilio SANTOS	66
The EPR is a Most Interesting Puzzle, Now More than Ever		
	Werner A. W. MEHLHOP and Oreste PICCIONI	72
Non-Equilibrium Dynamics		
Spontaneous Creation of Dissipation in Thermo Field Dynamics		
	Hiroomi UMEZAWA and Toshihico ARIMITSU	79
Quantum-Field Theoretical Approach to Non-Equilibrium Dynamics in Curved Space-Time		
	Izumi OJIMA	91
Aharonov-Bohm Effect and Electron Interferometry		
Proof of the Aharonov-Bohm Effect with Completely Shielded Magnetic Field		
	Akira TONOMURA, Shinichiro YANO, Nobuyuki OSAKABE, Tsuyoshi MATSUDA, Hiroji YAMADA, Takeshi KAWASAKI and Junji ENDO	97
Interpretation of Transverse Fringes in Highly Resolved Electron Micrographs of Self-Supporting Extremely Thin (<20 nm) Spider Fibrils	Gottfried MÖLLENSTEDT and H. M. PETERS	106
Coherence and Contrast in Electron Microscopy and Electron Interferometry	Friedrich LENZ	112
Aharonov-Bohm Effect (Theory)		
Multiply-Connected Spaces and the A-B Effect	Y. OHNUKI	117
The Aharonov-Bohm Effect: Quantization and Topology	Katsuhiko SEKINE	127
The Aharonov-Bohm Effect with Higher Winding Numbers	Akira INOMATA	132
Quantum Hall Effect		
Theory of the Fractional Quantum Hall Effect	Daijiro YOSHIOKA	140
Abrupt Disappearance of the Quantum Hall Effect Observed in Silicon <i>n</i> -Inversion Layers		
	Joji KINOSHITA, Katsuya INAGAKI, Chikako YAMANOUCHI, Kazuo YOSHIIRO, Jun-ichi WAKABAYASHI and Shinji KAWAJI	150
Aharonov-Bohm Effect in the Quantised Hall Effect	Hideo AOKI	155
Anomaly in Three-Dimensional Fermion Theory and Quantum Hall Effect	Kenzo ISHIKAWA	165
Fractional Quantum Statistics in Two-Dimensional Systems	Yong-Shi WU	171

Special Session

Complex Phases in Quantum Mechanics	Chen Ning YANG	181
Theory of Quantum Mechanical Measurements	Willis E. LAMB, Jr.	185

Microfabrication and Quantum Mechanics I

The Aharonov-Bohm Effect and Long-Range Phase Coherence in Normal Metal Rings	R. A. WEBB, S. WASHBURN, A. D. BENOIT, C. P. UMBACH and R. B. LAIBOWITZ	193
Universal Conductance Fluctuations and Quantum Interference Effects in Mesoscopic and Macroscopic Systems. A. Douglas	STONE	207
Theory of A-B Effect in Normal Metal Rings	Yoshimasa ISAWA, Hiromichi EBISAWA and Sadamichi MAEKAWA	218
Aperiodic Magnetoconductance Fluctuations in Nanometer-Structure GaAs Wire	Kouji ISHIBASHI, Koh NAGATA, Kenji GAMO, Susumu NAMBA, Shuichi ISHIDA, Kazuo MURASE, Mitsuo KAWABE and Yoshinobu AOYAGI	225

Microfabrication and Quantum Mechanics II

Realization of Semiconductor-Coupled Superconducting Transistor	Toshikazu NISHINO and Ushio KAWABE	231
Electric Field Effect on Superconductivity in an Inversion Layer Proximity System	Hideaki TAKAYANAGI	241

Squeezed States of Light and Quantum Jumps

Generation of Squeezed States of Light	D. F. WALLS, M. D. REID, C. W. GARDINER and G. J. MILBURN	248
Macroscopic Quantum Jumps in a Single Atom	Richard G. BREWER and Axel SCHENZLE	257
Quantum Nondemolition Measurement of Photon Number and Number-Phase Minimum Uncertainty State	Y. YAMAMOTO, N. IMOTO and S. MACHIDA	265

Conceptual Problems

Separation of an Acausal Subsystem from a Causal Total System	Satosi WATANABE	276
Probabilistic Interpretation of Quantum Mechanics	Jerzy RAYSKI	282

Macroscopic Quantum Effects

The Current Status of Quantum Mechanics at the Macroscopic Level	A. J. LEGGETT	287
Observation of a New Macroscopic Quantum Effect in a Two-Dimensional Cluster of Extremely Small Josephson Junctions	Kazuo YOSHIHIRO, Joji KINOSHITA, Katsuya INAGAKI and Chikako YAMANOUCHI	298
New Quantum Macroscopic Effects in Extremely Small Josephson Junctions	K. K. LIKHAREV	307

Quantum Field Theory and Related Problems

Borel Summability of Perturbation Series and Its Generalizations	Arthur S. WIGHTMAN	308
Creation of Space-Time and Motion: Pregeometrical String Field Theory	Taichiro KUGO	315
An Approach to Finite Non-Perturbative Quantum-Electrodynamics	A. O. BARUT	323
Physics with Magnetic Charges and Electric Currents	Harry J. LIPKIN and Murray PESHKIN	328
Stochastic Quantization and Related Problems	Mikio NAMIKI	333

Theories of Measurement

On Superselection Rules	Huzihiro ARAKI	348
Proposal of Experimental Test of "Environment-Induced Superselection Rule" in Quantum Measurement Theory	Shigeru MACHIDA and Mikio NAMIKI	355
Characterization and Realization of General Quantum Measurements	Horace P. YUEN	360

Closing Addresses

Closing Address	Sadao NAKAJIMA	364
Closing Address	Yasutsugu TAKEDA	366
Abstracts of Topical Meeting		367
Abstracts of Satellite Meeting		371

List of Participants		375
Author Index		385