

Contents

Opening Addresses

.....	S. NAKAJIMA	1
.....	Y. TAKEDA	2
.....	R. KUBO	3

Aharonov-Bohm Effect

Gauge Fields, Electromagnetism and the Bohm-Aharonov Effect	C. N. YANG	5
Non-Local Phenomena and the Aharonov-Bohm Effect	Y. AHARONOV	10
Electron Holography, Aharonov-Bohm Effect and Flux Quantization	A. TONOMURA, H. UMEZAKI, T. MATSUDA, N. OSAKABE, J. ENDO and Y. SUGITA	20
Coherent Electron Optical Experiments Using an Electron Mirror	H. LICHTER	29
Recent Observations on a New Electrostatic Phase-Shifting Effect	G. MATTEUCCI, G. MISSIROLI, M. PORRINI and G. POZZI	39
Hydrodynamical Quantization and Spin	T. TAKABAYASHI	44
Aharonov-Bohm Effect: Influence of the Electron's Field, and Speculations on the Possibility of Shielding	M. PESHKIN	56
Quantum Propagation in a Dislocated Medium	K. KITAHARA, K. NAKAZATO and H. ARAKI	59
Relativistic Electromagnetic-Gravitational Effects in Quantum Interference	J. S. ANADAN	65

Macroscopic Quantum Tunneling

The Superposition Principle in Macroscopic Systems	A. J. LEGGETT	74
Metastability in a SQUID and Macroscopic Quantum Tunneling	R. DE BRUYN OUBOTER	83

Quantum Microelectronics

Advances in Microfabrication and Microstructure Physics	H. SAKAKI	94
Fundamental Problems of Digital Information Processing	R. W. KEYES	111

Theory of Measurement

Critical Review of Theory of Measurement in Quantum Mechanics	S. MACHIDA and M. NAMIKI	127
Macroscopic Nature of Detecting Apparatus and Reduction of Wave Packet	S. MACHIDA and M. NAMIKI	136
Delayed-Choice Experiments and Bohr's Elementary Quantum Phenomenon	W. A. MILLER and J. A. WHEELER	140
A Proposed Delayed-Choice Experiment Using Ultra-Cold Neutrons	W. A. MILLER	153
A Delayed Random Choice Quantum Mechanics Experiment with Light Quanta	C. O. ALLEY, O. JAKUBOWICZ, C. A. STEGGERDA and W. C. WICKES	158
Statistics of Continuous Trajectories and the Interpretation of Quantum Mechanics	A. BARCHIELLI, L. LANZ and G. M. PROSPERI	165
Pointer Basis, and Inhibition of Quantum Tunneling by Environment-Induced Superselection	W. H. ZUREK	181
Quantum Frames of Reference	T. KAUFHERR and Y. AHARONOV	190

Quantum Nondemolition Measurement

Quantum Nondemolition Measurements	C. M. CAVES	195
Quantum Network Theory	B. YURKE and J. S. DENKER	206

Einstein-Podolsky-Rosen Paradox

Experiments on Einstein-Podolsky-Rosen-Type Correlations with Pairs of Visible Photons	A. ASPECT and P. GRANGIER	214
Controllable and Uncontrollable Non-Localities	A. SHIMONY	225
Quantum Potential Model for the Quantum Theory	D. BOHM and B. J. HILEY	231
Lorentz and CPT Invariances and the Einstein-Podolsky-Rosen Correlations	O. COSTA DE BEAUREGARD	233
Controversy about the Interpretation of Quantum Phenomena	J. RAYSKI	242

Quantum Logic	
Quantum Logical Description of Microsystems	E.-W. STACHOW 244
Analysis of the EPR-Experiment by Relativistic Quantum Logic	P. MITTELSTAEDT 251
Quantum Logic and Quantization	G. TAKEUTI 256
Philosophy of Quantum Mechanics	
Is Reductionism Tenable within Physics ?	S. WATANABE 261
The Experiment in Classical and in Quantum Physics	M. JAMMER 265
Neutron Interferometry	
Test of Quantum Mechanics by Matter Wave Interferometry	H. RAUCH 277
Search for Unorthodox Phenomena by Neutron Interference Experiments	A. ZEILINGER, M. A. HORNE and C. G. SHULL 289
Delayed-Choice Experiments with the Neutron Interferometer	D. M. GREENBERGER, M. HORNE, C. SHULL and A. ZEILINGER 294
Quantum Optics	
Fundamental Experiments in Quantum Optics	H. M. GIBBS 301
Study on the Coherent Intermode Correlation of the Exciton-Polariton in Spatially Dispersive Region of CuCl	N. NAGASAWA and M. KUWATA 311
Quantization of the Polaritons of a Composite System and the Correlation among the Reflected and Refracted Lights	M. NAKAYAMA 315
Relativistic Electron Theory and Foundations of Quantum Theory	A. O. BARUT 321
Quantum Hall Effect	
Quantum Hall Effect	S. KAWAJI 327
Precision Measurement of Quantum Hall Effect in Silicon MOS <i>n</i> -Inversion Layers	J. KINOSHITA, K. INAGAKI, C. YAMANOUCHI, K. YOSHIHIRO, T. ENDO, Y. MURAYAMA, M. KOYANAGI, J. MORIYAMA, J. WAKABAYASHI and S. KAWAJI 339
Gauge-Transformation Study of Quantised Hall Effect	H. AOKI 346
Quantized Hall Effect, Cantor Spectrum and Smale Horseshoe	M. KOHMOTO 353
How Accurate are the Predictions of Quantum Mechanics of Many-Body Systems ?	T. KINOSHITA 357
Future Prospect	
Quantum Mechanics: Prospects and Problems	Y. NAMBU 363
Summary of Post-Symposium Discussion-Meetings	
1. Aharonov-Bohm Effect	367
2. Neutron Interferometry	368
List of Participants	369
Author Index	378