



Current Issues in Quantum Logic /

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Monografía

These are the proceedings of the Workshop on Quantum Logic held in Erice (Sicily), December 2 - 9, 1979, at the Ettore Majorana Centre for Scientific Culture. A conference of this sort was originally proposed by Giuliano Toraldo di Francia, who suggested the idea to Antonino Zichichi, and thus laid the foundation for the Workshop. To both of them we express our appreciation and thanks, also on behalf of the other participants, for having made this conference possible. There were approximately fifty participants; their names and institutions are listed in the text. Quantum logic, which has now a history of some forty or more years, has seen remarkable growth during the sixties and seventies. The papers in the present volume presuppose, by and large, some acquaintance with the elements of the subject. These may be found in the well-known books by J.H. Jauch (Foundations of Quantum Mechanics; Reading, 1968), V.S. Varadarajan (Geometry of Quantum Theory; Princeton, 1968), and C. Piron (Foundations of Quantum Theory; New York, 1976). The initial program for the conference listed about twenty-five invited papers. But in the context of a very active and qualified attendance, other contributions were offered. This volume contains all of them. The program listed six main topics: I. Classification of different areas of quantum logic, and open problems. II. Comparison and unification of different approaches to quantum theories; problems of interpretation. III. Formal quantum logic; axiomatics. IV. Modal interpretations of quantum logic. v vi FOREWORD V. Quantum set theory

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Contenido: 1: Classification of Different Areas of Quantum Logic, and Open Problems -- Classification of different areas of work afferent to quantum logic -- Assumptions and interpretations of quantum logic -- 2: Comparison and Unification of Different Approaches to Quantum Theories; Problems of Interpretation -- What are quantum logics and what ought they to be? -- Charting the labyrinth of quantum logics: a progress report -- Realism and quantum logic -- What does quantum logic explain? -- A new approach to equivalence in quantum logic -- How

to rewrite a stochastic dynamical theory so as to generate a measurement paradox -- The quantum logical and the operational description for physical systems -- 3: Formal Quantum Logic; Axiomatics -- Partial referential matrices for quantum logics -- Some metalogical pathologies of quantum logic -- Quantum logic as an extension of classical logic -- Sequential quantum logic -- Entailment and Quantum Logic -- Some problems and methods in formal quantum logic -- 4: Modal Interpretations of Quantum Logic -- A modal interpretation of quantum mechanics -- The dialogic approach to modalities in the language of quantum physics -- The inner language of operational quantum mechanics -- 5: Quantum Set Theory -- Quantum set theory -- Quantum sets, assemblies and plexi -- Omologic as a Hilbert type calculus -- Measure and integration in quantum set theory -- 6: Advances Concerning Mathematical Structure; Other Problems -- Commutativity and generalized transition probability in quantum logic -- Representations of Baer *-semigroups and quantum logics in Hilbert space -- A non-standard quantum logic with a strong set of states -- Description of compound physical systems and logical interaction of physical systems -- Products of logics -- Space time structure from quantum logic -- Causal logic of Minkowski space-time -- Propositional systems in field theories and lattice-valued quantum logics -- Non-linear integration and signed measures on von Neumann algebras -- On the inter-relations of the three quantal principles -- On the non-unique decomposability of quantum mixtures -- Motion and form -- Participants -- Author Index

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