1. Record Nr. UNINA9910790869503321 Luttinger model: the first 50 years and some new directions //edited Titolo by Vieri Mastropietro, University of Milan, Italy, Daniel Charles Mattis, University of Utah, USA New Jersey:,: World Scientific,, [2014] Pubbl/distr/stampa 2014 **ISBN** 981-4520-72-1 Descrizione fisica 1 online resource (xiii, 297 pages): illustrations (some color) Series on directions in condensed matter physics, , 1793-1444;; Collana volume 20 Disciplina 530.12015195 Soggetti Luttinger liquids Condensed matter - Research Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Includes bibliographical references. Nota di bibliografia Nota di contenuto CONTENTS; Preface Vieri Mastropietro; Introduction Daniel C. Mattis; Chapter I:. The Luttinger Model and Its Solution: An Exactly Soluble Model of a Many-Fermion System Joaquin M. Luttinger; I. INTRODUCTION; II. EXACT SOLUTION OF THE MODEL; III. EXPLICIT EVALUATION OF MOMENTUM DISTRIBUTION; IV. COMPARISON WITH PERTURBATION THEORY: V. RESPONSE TO EXTERNAL FIELDS: APPENDIX: ACKNOWLEDGMENTS; Exact Solution of a Many-Fermion System and Its Associated Boson Field Daniel C. Mattis and Elliott H. Lieb; I. INTRODUCTION; II. MODEL HAMILTONIAN; III. CASE OF THE FILLED DIRAC SEA IV. SOLUTIONS OF THE MODEL HAMIITONIANV. EVALUATION OF THE MOMENTUM DISTRIBUTION: VI. DIELECTRIC CONSTANT; APPENDIX: ACKNOWLEDGMENTS; Chapter II: Lattice, Dynamical and Nonlinear Effects: Luttinger Model and Luttinger Liquids Vieri Mastropietro: 1. Introduction; 2. The Luttinger Model Exact Solution; 3. Nonsolvable Lattice Models and the Luttinger Liquid Conjecture; 4. Exact Renormalization Group Analysis; 5. Emerging Symmetries and Vanishing of Beta Function; 6. Ward Identities and Anomalies; 7. Proof

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Sommario/riassunto

The Luttinger Model is the only model of many-fermion physics with legitimate claims to be both exactly and completely solvable. In several respects it plays the same role in many-body theory as does the 2D Ising model in statistical physics. Interest in the Luttinger model has increased steadily ever since its introduction half a century ago. The present volume starts with reprints of the seminal papers in which it was originally introduced and solved, and continues with several contributions setting out the landscape of the principal advances of the last fifty years and of prominent new dire