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Nota di contenuto	Chapter 1. Pilot-wave theory in the 21st Century (Paulo Castro, John Bush and J. R. Croca) -- Chapter 2. The state of play in Hydrodynamic Quantum Analogs (John W. M. Bush, Valeri Frumkin and Konstantinos Papatryfonos) -- Chapter 3. Establishing long-range pilot-wave interactions (André Nachbin) -- Chapter 4. Hydrodynamically Inspired Pilot-Wave Theory: An Ensemble Interpretation (Yuval Dagan) -- Chapter 5. On Multi-Time Correlations in Stochastic Mechanics (Maaneli Derakhshani and Guido Bacciagaluppi) -- Chapter 6. A version of de Broglie's double solution theory reproducing Landau's quantization in a uniform magnetic field (Pierre Jamet and Aurélien Drezet) -- Chapter 7. Convergence to quantum equilibrium: deterministic vs stochastic pilot wave dynamics (Mohamed Hatifi, Ralph Willox and Thomas Durt) -- Chapter 8. Non-Quantum Behaviors of Configuration-Space Density Formulations of quantum mechanics (Philipp Roser and Matthew Scoggins) -- Chapter 9. The Doubochinski pendulum – a paradigm for quantization through nonlinear interactions (Jonathan Tennenbaum) -- Chapter 10. Completing the quantum ontology with the electromagnetic zero-point field (Luis de la Peña and Ana María Cetto) -- Chapter 11. Are Hidden-Variable Theories for Pilot-Wave Systems

Possible? (Louis Vervoort) -- Chapter 12. The Wave-memory interpretation of Quantum Mechanics (Paulo Castro) -- Chapter 13. What if We Lived in the Best of All Possible (Quantum) Worlds? (Valia Allori) -- Chapter 14. How the history of thermodynamics informs the hidden variables debate in quantum mechanics (Adam Kay) -- Chapter 15. Form, function, and continuity: knowledge on the move (Gildo Magalhães) -- Chapter 16. John Bell's unpublished notes about de Broglie's Pilot Wave (Augusto Garuccio, Angela Laurora) -- Chapter 17. The Quest for the Ontic Nature of the Quantum Waves (J.R. Croca) -- Index.

Sommario/riassunto

This book provides a state-of-the-art review of Pilot Wave Theory at the beginning of the XXI century. It contains the best contributions of the first International Conference on Advances in Pilot Wave Theory, held in Lisbon in 2021. The event brought together physicists from the new emerging field of Hydrodynamic Quantum Analogs (HQA) and philosophers of science. Three main themes were discussed: 1. Hydrodynamic quantum analogs, 2. Theoretical advances in pilot wave physics and, 3. Philosophical foundations of pilot wave theory. Recent experimental work in HQA has provided impetus to develop the pilot-wave approach into a realistic basis of quantum mechanics, specifically a dynamical completion of the existing theory of quantum statistics. To that end, the meeting featured theoretical work that advanced Louis de Broglie original pilot wave theory. This collection shows how several aspects of quantum systems have been reproduced in the hydrodynamic environment, and how the power of analogy suggests the possibility of a relatively intelligible quantum realm. Most notably, the notion of memory, as engendered in the pilot-wave-hydrodynamic system, suggests a profitable direction to explore in developing a more complete description of quantum phenomena. This book is expected to be of great interest to physicists, computer scientists and philosophers of science interested in the foundations of Quantum Mechanics.