Classical, Semi-classical and Quantum Noise

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Editors

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Preface

David Middleton was a towering figure of the Twentieth Century engineering and science. He was the originator of many fundamental ideas and methods, and was one of the founders of statistical communication theory. To honor David's contributions, a symposium, "The Middleton Meeting on Classical, Semiclassical, and Quantum Noise," was held on November 2 and 3, 2007, at Princeton University. David was present at the symposium and gave one of the talks. This book is an outcome of that meeting.

David's seminal contributions span more than six decades and have had a major impact on many fields, including radar, sonar, communications, noise theory, and probability theory, among many others. His work was a unique blend of fundamental theory and applications. During the second world war, a young David Middleton working with John H. Van Fleck (who would go on to receive the Nobel Prize in Physics) devised the notion of the matched filter, which is the most basic method used in detecting signals in noise. At the same time, and working independently, D.O. North developed the same idea. In 1960, after making many pioneering contributions, David published a book that has become a classic in the field: "An Introduction to Statistical Communication Theory." This is a monumental book that had, and continues to have, a profound impact on researchers in many fields. It became the basic book for learning stochastic processes and communication theory for thousands of engineers and scientists over the intervening years.

Over the past 10 years or so, David was writing a new book entitled "Elements of Non-Gaussian Space-Time Statistical Communication Theory, Propagation, Noise, and Signal Processing in the Canonical Channel." Sadly, David passed away on November 16, 2008, at the age of 88 years, before this second masterwork could be completed. However, the material that he had already completed represents a major contribution in itself, and will be published posthumously in the near future. In the final chapter of the current volume, we include the Introduction to his new book. It is a wonderful presentation of the field of communication, and of his own views on the field that he developed over the past 60 years.

We wish to express our deep appreciation to the authors who contributed to this volume, which is a very fitting tribute to our late friend and colleague David Middleton.

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