Preface

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These two volumes constitute the Proceedings of the "Conférence Moshé Flato 1999". Their spectrum is wide but the various areas covered are in fact strongly interwoven by a common denominator, the unique personality and creativity of the scientist in whose honor the Conference was held, and the far-reaching vision that underlies his scientific activity.

In 1928, there appeared the first edition of Hermann Weyl's seminal book, "Gruppentheorie und Quantenmechanik". Its English edition was a bedside book for Moshé. Symmetries, covariant field equations, and quantization are the main ingredients in that book. These notions played a fundamental role in the development of theoretical physics in the twentieth century, and their interactions with mathematics were at the origin of new avenues of research. In the seventies Moshé added to this list a fourth ingredient, deformation theory. Thereby he was able to explain, on the conceptual level, the evolution of physics from one domain of scale to another — in particular quantization. This addition turned out to be seminal also in mathematics.

With the present set of two volumes the reader will be able to take stock of the present state of the art in a number of subjects at the frontier of current research. It represents a covering of Flato's manifold interests by strongly intertwined contributions. It will be of interest to many researchers and graduate students in a variety of domains, ranging from abstract mathematics to theoretical physics and other applications. Some parts will be accessible to good undergraduate students, and even to persons with a minimum of scientific knowledge and enough curiosity.

Moshé Flato, born September 17, 1937, founder in 1968 of the "Laboratoire de Mathématique physique" in Dijon and of "Letters in Mathematical Physics" in 1975, died suddenly from cerebral hematoma in Paris, November 27, 1998. At the request of many in the mathematics and mathematical physics community, a Conference was organized in his honor. The idea was to have a Conference which Moshé would have been happy to attend, which shows the many domains of mathematics, mathematical physics and physics that were close to his heart. It took place in Dijon, September 5 through September 8, 1999. Its various components were attended by about 150 French and foreign scientists, in addition to a number of other participants. Indeed, Moshé would have enjoyed this conference immensely. (A follow-up conference takes place in September 2000, a "EuroConference"; it is dedicated to the most recent progress in the main areas treated in the 1999 Conference, which contributed to trigger those dramatic developments.)

The present Proceedings start with a more personal touch on Moshé Flato, the man and the scientist. It will be of interest to the many who have known him, to those who wish they had, and to historians of Science. A small section is dedicated to applications of sciences in insurance and finance, in relation with Moshé's activity as founder of the Scientific Council of Union des Assurances de Paris. At a time when these applications become increasingly fashionable, the indications that they give will be of interest also to mathematicians and physicists.

The bulk of the two volumes is the 'physical mathematics' part where the reader will find the above-mentioned four ingredients in various combinations, fundamental mathematical developments based on them, and challenging interpretations of physical phenomena. Most of the authors are leading scientists and all contributions were duly refereed. Even those mathematicians and physicists who do not (at present) work actively in the areas covered should find a lot of interest in these volumes. The Table of Contents is self-explanatory, so we shall not enter here into further details.

As coordinator of the Conference, I would like to thank all those who helped us make this Conference and these Proceedings possible, and responded so rapidly and efficiently to our requests. They include colleagues from all over the world, administrators at the local, national, and international level in a variety of capacities, and anonymous benefactors. A detailed list would be a "who is who" of Moshé's friends and he would have hated the idea, so we shall omit it. Last but not least, I would like to thank my co-editor for the fantastic job he did using his scientific and linguistic knowledges, combined with superb TEXpertise, to produce these camera-ready volumes.