

## Progress in supersymmetric quantum mechanics

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## PREFACE

## Progress in Supersymmetric Quantum Mechanics

The idea of preparing a special issue devoted to supersymmetric quantum mechanics (SUSY QM) emerged during the course of the International Conference on Progress in Supersymmetric Quantum Mechanics (PSQM'03), which was held at the University of Valladolid, Spain, 15–19 July 2003. The aim of this conference was to assemble active researchers and recognized experts in this field, giving them the opportunity to discuss recent progress and new lines of research, and to revise the most important successes in the area.

Although the mathematical origin of SUSY QM can be traced back to the 1882 classical work by Darboux (Darboux transformations), and the first applications in quantum mechanics appear in some papers by Schrödinger and Dirac, the term 'supersymmetric quantum mechanics' was coined after the renowned 1981 paper by Witten, who introduced SUSY QM as a toy model for supersymmetry breaking. During the 1980s there was a renewed interest in this topic, which gave rise to several outstanding papers and attracted the attention of many other researchers. Nowadays SUSY QM still represents a very active domain of research with a wide range of applications in different fields of theoretical and mathematical physics, such as non-linear equations, statistical physics, inverse scattering methods, and exactly solvable models, to mention just a few examples. Since there are several research groups, as well as a sufficiently large number of scientists, actively working in this field and presenting their results at different adjacent conferences, we thought that this would be the ideal time to bring everyone together at the first conference devoted specifically to SUSY QM.

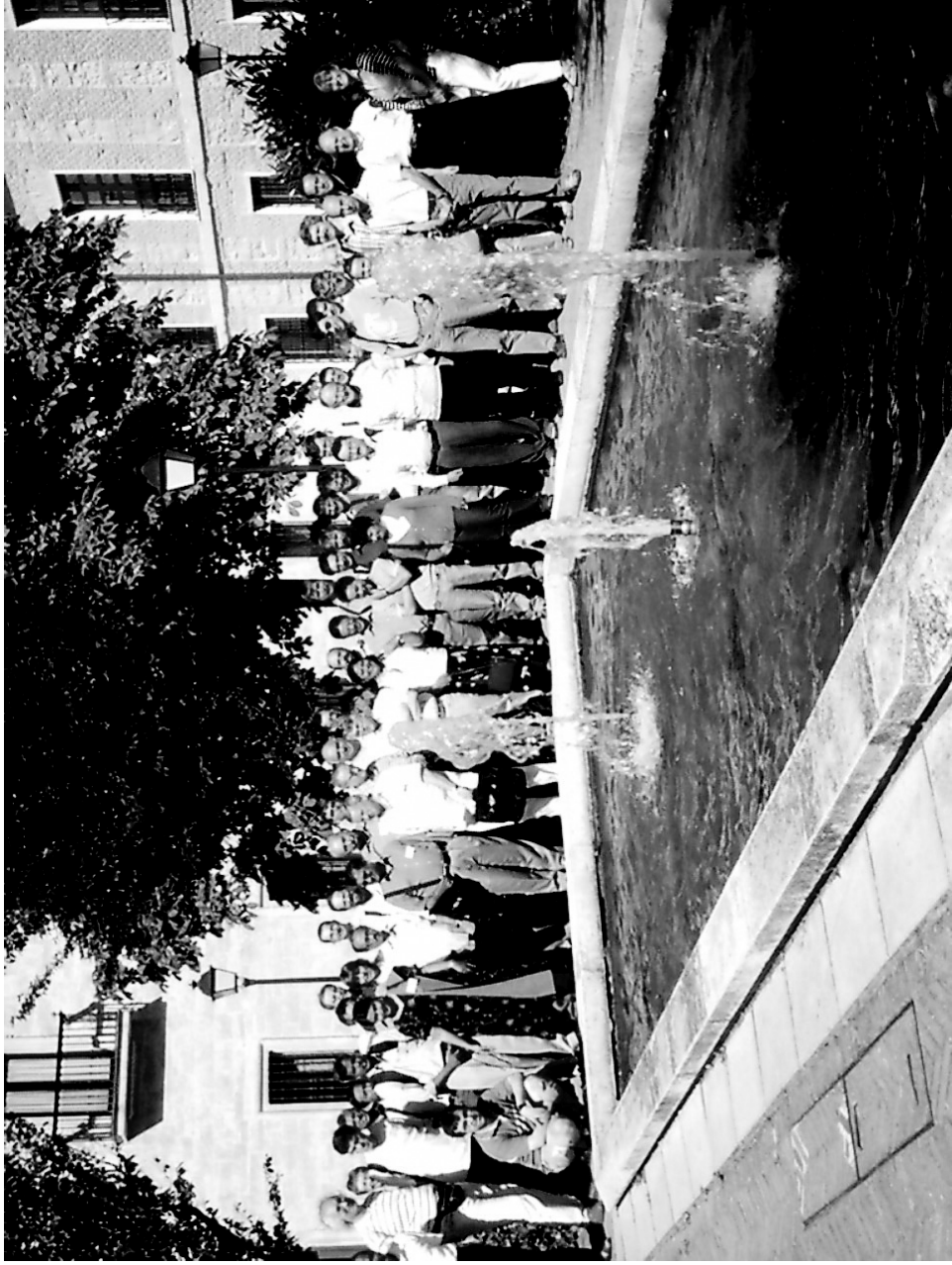
However, this special issue does not aim to be the proceedings of the aforementioned meeting in the usual sense. Indeed, there was an open call for papers and, as a result, some of the contributions come from people who did not attend the conference. It is also important to mention that all the papers appearing in this special issue have been subjected to the standard refereeing process of *Journal of Physics A: Mathematical and General*.

The special issue begins with a general survey paper and then it is organized into five sections devoted to the following general topics: *Solvable models*, *Complex PT-potentials*, *Inverse scattering and other applications*, *Non-linear and multidimensional SUSY*, and *SUSY algebras and related questions*. All the sections, except the last one, start with a review paper and contain a number of original articles. We hope that this issue will be useful not only for the specialist in the field, but also to people working in theoretical and mathematical physics.

We would like to thank all 63 participants at the conference PSQM'03 for their presence, their scientific contributions, and the warm atmosphere created during the event. We acknowledge the financial support given to PSQM'03 by Universidad de Valladolid, Junta de Castilla y León, and Ministerio de Ciencia y Tecnología of Spain. We also want to thank the authors contributing to this issue, as well as the referees for their efforts towards ensuring its high quality. Finally, we thank the staff of *Journal of Physics A: Mathematical and General* for their help and patience. Without them this special issue would not have been possible.

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**Guest Editors**



**Participants of the International Conference on Progress in Supersymmetric Quantum Mechanics (PSQM'03)**