

Preface

The VIIIth Conference in the series, 'Non-Hermitian Hamiltonians in Quantum Physics', was held at the Bhabha Atomic Research Centre, Mumbai from January 13 to January 16, 2009; on January 15, the sessions were conducted at the Tata Institute of Fundamental Research, Mumbai. About 160 participants, including scientists from Bhabha Atomic Research Centre, attended the conference and the conference consisted of 4 review talks, 3 keynote talks, 20 plenary talks, 26 specialized talks, and 13 poster presentations. This special issue contains the original results announced at the conference, in addition to two mini-reviews from pedagogical talks presented one day before the conference. The conference was also the first *Homi Bhabha Centenary Conference* of the year 2009.

About ten years ago, a possible generalization of quantum mechanics, which incorporates non-Hermitian Hamiltonians was proposed by Bender and Boettcher. This has led to a large flurry of research on \mathcal{PT} -symmetric quantum mechanics and quantum field theory. The physical systems that violate parity and time-reversal symmetry belong to this class – they include two-dimensional statistical mechanics, certain models in quantum chromodynamics, nuclei with \mathcal{PT} -symmetric shapes, and so on. Broadly, the themes addressed during the conference were: \mathcal{PT} -symmetry and pseudo-Hermiticity, open quantum systems, non-equilibrium statistical mechanics, random matrix and field-theoretic models, and quantum computation.

We wish to express our thanks to Srikumar Banerjee, Director, Bhabha Atomic Research Centre, and Mustansir Barma, Director, Tata Institute of Fundamental Research for their support and advice. We are grateful to Sir Michael V Berry, University of Bristol, England for delivering the inaugural lecture. Special thanks are due to Sir Michael V Berry, Kirone Mallick, Martin Sieber, and Roberto Tateo who delivered excellent pedagogical talks on January 12, 2009. It is also our great pleasure to thank the administrative and security staff of the Bhabha Atomic Research Centre and the staff at the Multipurpose Hall of the Training School Hostel where the conference was conducted. The conference was financially supported by the Board of Research in Nuclear Sciences and Tata Institute of Fundamental Research and we thank them gratefully. We also thank Vijai Kumar of Knowledge Management Group, BARC, and Miloslav Znojil, Nuclear Physics Institute, Czech Republic for the help extended towards registration and many other aspects of the conference. We thank Rohini Godbole, Chief Editor, *Pramana – Journal of Physics* for the encouragement received from her for the publication of the special issue;

the team at the Editorial Office has been very cooperative. Finally, I thank all the contributors and esteemed referees for their cooperation that helped us in bringing out this issue in an excellent time-frame.

Sudhir R Jain

Note: Editorial decisions of the papers written by Sudhir R Jain; O P S Negi and P S Bisht; and Abhas Mitra were taken by Zafar Ahmed. For the rest of the papers, the editorial decisions were taken by Sudhir R Jain.