

International Conference on Quantum Simulators and Design, Hiroshima, Japan, 3–6
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PREFACE**International Conference on Quantum Simulators and Design, Hiroshima, Japan, 3–6 December 2006**

This special issue of *Journal of Physics: Condensed Matter* comprises selected papers from the 1st International Conference on Quantum Simulators and Design (QSD2006) held in Hiroshima, Japan, 3–6 December 2006. This conference was organized under the auspices of the Development of New Quantum Simulators and Quantum Design Grant-in-Aid for Scientific Research on Priority Areas, Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), and Hiroshima University

Quantum design is a computational approach to the development of new materials with specified properties and functionalities. The basic ingredient is the use of quantum simulations to design a material that meets a given specification of properties and functionalities. For this to be successful, the quantum simulation should be highly reliable and be applicable to systems of realistic size. A central interest is, therefore, the development of new methods of quantum simulation and quantum design. This includes methods beyond the local density approximation of density functional theory (LDA), order-N methods, methods dealing with excitations and reactions, and so on, as well as the application of these methods to the design of new materials and devices.

The field of quantum design has developed rapidly in the past few years and this conference provides an international forum for experimental and theoretical researchers to exchange ideas. A total of 183 delegates from 8 countries participated in the conference. There were 18 invited talks, 16 oral presentations and 100 posters. There were many new ideas and we foresee dramatic progress in the coming years.

The 2nd International Conference on Quantum Simulators and Design will be held in Tokyo, Japan, 31 May–3 June 2008.

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