Special issue on quantum information theory

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Quantum information science is one of the frontier areas of science and technology. It is also an interdisciplinary area of research where scientists from physics, mathematics, and computer science can contribute alike. One of the main goals is how well one can process information using laws of quantum theory. Quantum information theory aims to process information that is not amenable with classical devices. At the same time this also provides new insights into the nature of the quantum world. Quantum information processing includes quantum computation, quantum communication, quantum cryptography and various information processing tasks. Not only does this provide a fundamental arena to investigate quantum phenomena but also gives new technological benefits like quantum teleportation, remote state preparation and secure communications.

In India there is a growing interest in this emerging field. In view of this we had organized an International Program on Quantum Information (IPQI-2010) at the Institute of Physics, Bhubaneswar during January 4–January 30, 2010. In this programme, there were experts from all over the world and topics of focus were on various issues related to quantum information science and general quantum theory, characterization and quantification of entanglement, quantum channels and quantum operations, role of entanglement in quantum algorithms and quantum computation, developing new quantum algorithms, understanding of capacities of quantum channels, and new communication tasks in the multiparty case.

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During this International program Dr. Brandt kindly invited this special issue. Though this issue got delayed due to several unforeseen reasons, we hope that this special issue will be of interest to scientists in quantum information and that they will enjoy reading these collections. We express our thanks to the editorial staff of QIP for bringing out this special issue.