From the Editor's Desk

As I promised in the previous issue, we are bringing out the issue on "Quantum Computation" edited by Professors Vasant Natarajan and Anil Kumar of the Physics Department, Indian Institute of Science, Bangalore well in time. I appreciate the efforts of both the editors and the editorial staff for working overtime to achieve this goal. This issue holds promise to herald the upcoming features of computation like speed and accuracy hitherto unattained by classical computation. The diversity of topics is nicely blended into this issue by the guest editors and I am sure that the readers will enjoy and get sufficiently educated to appreciate the facets of this new technological prospect. The coming issues for the year 2009 and 2010 keep the tempo of bringing overview reviews in new and topical areas.

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Editorial

The field of Quantum Computation has generated tremendous interest both among scientists and the general public. It arises out of the counter-intuitive laws of quantum mechanics, a subject that continues to fascinate people even about a century after its discovery. The weirdness of quantum mechanics is perhaps best captured by entangled states and measurements on these states. Einstein wrote his famous EPR paradox paper to convey his displeasure with this feature of the quantum world. But, whatever be his philosophical objections, even Einstein had to accept it as an essential feature of quantum mechanics. In recent times, entangled states have been exploited to propose new possibilities in cryptography, teleportation, and computation, broadly classified as "quantum information processing". The field of quantum computation, in particular, promises to enable new and faster kinds of calculations not possible with classical computers.

In this issue, the emerging field of quantum information processing is covered in a series of articles written by experts in this area. Articles ranging from classical and quantum cryptography and the role of entanglement and decoherence in quantum computation, to other theoretical developments such as the role of quantum correlations and a unified model for qubit representation are contained in this issue. Two promising experimental implementations of quantum computation are: nuclear magnetic resonance (NMR) and trapped ions. Experimental developments of these techniques are described in three articles. The current issue will thus serve as a valuable reference for both experimental and theoretical scientists working in this topical area of research.

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