



# **Parallel Computing Using Optical Interconnections (The Springer International Series in Engineering and Computer Science)**

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## Parallel Computing Using Optical Interconnections (The Springer International Series in Engineering and Computer Science)

Advances in optical technologies have made it possible to implement optical interconnections in future massively parallel processing systems. Photons are non-charged particles, and do not naturally interact. Consequently, there are many desirable characteristics of optical interconnects, e.g. high speed (speed of light), increased fanout, high bandwidth, high reliability, longer interconnection lengths, low power requirements, and immunity to EMI with reduced crosstalk. Optics can utilize free-space interconnects as well as guided wave technology, neither of which has the problems of VLSI technology mentioned above. Optical interconnections can be built at various levels, providing chip-to-chip, module-to-module, board-to-board, and node-to-node communications.

Massively parallel processing using optical interconnections poses new challenges; new system configurations need to be designed, scheduling and data communication schemes based on new resource metrics need to be investigated, algorithms for a wide variety of applications need to be developed under the novel computation models that optical interconnections permit, and so on.

*Parallel Computing Using Optical Interconnections* is a collection of survey articles written by leading and active scientists in the area of parallel computing using optical interconnections. This is the first book which provides current and comprehensive coverage of the field, reflects the state of the art from high-level architecture design and algorithmic points of view, and points out directions for further research and development.

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