**Abstract**

Internal modes of light can be used for efficient realization of any discrete arbitrary unitary matrix. For n s spatial modes and n i internal modes of light, we present a scheme for realizing (n s n i ) × (n s n i ) dimensional Quantum Fourier Transform (QFT) matrix. A generalized scheme for decomposing QFT matrix into physically real- izable matrices corresponding to spatial and internal transformations is developed and then demonstrated for various choices of spatial and internal modes in realizing four-dimensional, eight-dimensional and twelve-dimensional QFT matrices. This de- composition reduces the number of beam splitters required for implementing QFT matrices, with an addition of internal transformations. Furthermore, implementation of the permutation matrices involved in realization of QFT are investigated.