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Unitary Integration and Fiber Bundle Geometry of N-level Quantum Systems. DMITRY USKOV, RAVI RAU, Louisiana State University — Geometric properties of quantum systems, such as Berry's geometric phase and later generalizations, bring out important characteristics of quantum physics. They are now central to the field of quantum computation as a possible route to fault tolerant operation. We use fiber bundle technique to describe SU(N) quantum dynamics of N-level system as a fiber bundle over a 2(N-1)-dimensional projective space and $(N-1)^2$-dimensional SU(N-1)$\times$U(1) fiber. This provides a hierarchical route to a higher SU(N) groups in terms of lower dimensional ones.

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