Path integral representation of a two qubit system\textsuperscript{1} JUSTIN WILSON, VICTOR GALITSKI, University of Maryland — In the path integral representation of a one qubit system, extra degrees of freedom are needed to pass from the Hamiltonian formulation to the path integral (Lagrangian) formulation. This leads to a topological term in the Lagrangian much like a Wess-Zumino term. Such a term is topological and is related to the Hopf fibration of $S^3$ by $S^1$ over $S^2$ (and indeed this term appears even when the Hamiltonian is zero). There is an analogous Hopf fibration for the two qubit state from $S^7$ by $S^3$ over $S^4$. We explore how this is related to the topological term in the path integral formulation for two qubit systems.

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