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Properties of the Generalized Kodama States ANDREW RANDONO, University of Texas at Austin — The original incarnation of the Kodama/Chern-Simons State of canonical quantum gravity employs a restriction of the phase space to self-dual connections thereby fixing the Immirzi parameter at the unit imaginary, $\gamma = i$. We recently proposed a generalization of the state for arbitrary values of the Immirzi parameter and gave strong evidence to suggest that the generalized state is also a solution to the Hamiltonian constraint of canonical quantum gravity. We suggested that for real values of γ, the generalized state is CPT invariant, delta-function normalizable, and invariant under large gauge transformations. Follow-up investigations have revealed that the state can be written as the exponent of the second Chern class minus the Euler charactersitic, pulled back to a 3-dimensional spacelike boundary, thereby yielding an intrinsically 4-dimensional definition and an intimate connection with known topological field theories. Furthermore, the state has a simple semi-classical interpretation as the WKB state corresponding to spacetimes with constant 4-curvature. There is an infinite family of such spacetimes each characterized by the equivalence class of 3-curvatures modulo gauge transformations and diffeomorphisms, R. To each of these classical spacetime configurations there exists a generalized Kodama state $|\psi_R>$. A formal argument shows that these states are expected to be orthogonal with respect to a natural inner product: $<\psi'_R|\psi_R>= \delta(R'-R)$.

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