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On Resolutions of Cosmological Singularities in Higher-Spin Gravity¹ BENJAMIN BURRINGTON, Troy University, LEOPOLDO PANDO ZAYAS, NICHOLAS ROMBES, University of Michigan — Gravity in three dimensions is simpler than in four, due to the lack of gravitational waves, and can be recast as a Chern-Simons theory. In this context, it is straightforward to generalize Einstein's gravity, with or without cosmological constant, by changing the gauge group. Using this, we study the resolution of certain cosmological singularities, and extend the singularity resolution scheme proposed by Krishnan and Roy. We discuss the resolution of a big-bang singularity in the case of gravity coupled to a spin-4 field realized as Chern-Simons theory with gauge group $SL(4, C)$. We show the existence of gauge transformations that do not change the holonomy of the Chern-Simons gauge potential and lead to metrics without the initial singularity. We argue that such transformations always exist in the context of gravity coupled to a spin- N field when described by Chern-Simons with gauge group $SL(N, C)$.

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