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General Relativity and Quantum Cosmology

On the regularization of the constraints algebra of Quantum Gravity in 2+1 dimensions with non-vanishing cosmological constant

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(Submitted on 19 Jan 2010 (v1), last revised 12 Feb 2010 (this version, v2))

We use the mathematical framework of loop quantum gravity (LQG) to study the quantization of three dimensional (Riemannian) gravity with positive cosmological constant (Lambda>0). We show that the usual regularization techniques (successful in the Lambda=0 case and widely applied in four dimensional LQG) lead to a deformation of the classical constraint algebra (or anomaly) proportional to the local strength of the curvature squared. We argue that this is an unavoidable consequence of the non-local nature of generalized connections.

Comments: Minor corrections, figures improved and references added

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**

Cite as: **arXiv:1001.3292v2 [gr-qc]**

Submission history

From: Alejandro Perez [view email]

[v1] Tue, 19 Jan 2010 13:14:02 GMT (35kb)

[v2] Fri, 12 Feb 2010 17:09:04 GMT (39kb)

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