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Contribution ID: 4415      Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

## **(G) On the $SU(2)$ gauge symmetry in Loop Quantum Cosmology**

*Monday 27 May 2024 15:15 (15 minutes)*

Loop Quantum Cosmology offers a successful quantization of cosmological models using techniques adapted from Loop Quantum Gravity (LQG). However, the connection with LQG remains unclear, primarily due to the absence of the  $SU(2)$  gauge symmetry, which is a fundamental aspect of LQG. We aim to address this issue by demonstrating that the Gauss constraint can always be reformulated into abelian constraints within the cosmological framework, indicating the inherent abelian nature of the model in the minisuperspace.

To overcome this challenge, we propose employing a symmetry reduction approach inspired by Yang-Mills theory. This approach compels us to leave the minisuperspace, but, on the other hand, it allows us to construct a classical cosmological sector for the theory within the LQG framework and provide an analogous quantization.

### **Keyword-1**

Quantum Cosmology

### **Keyword-2**

Loop Quantum Gravity

### **Keyword-3**

Symmetry reduction

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**Session Classification:** (DTP) M2-2 Gravity and Cosmology | Gravité et cosmologie (DPT)

**Track Classification:** Technical Sessions / Sessions techniques: Theoretical Physics / Physique théorique (DTP-DPT)