



Contribution ID : 44

Type : **not specified**

Scalar curvature operator for loop quantum gravity on a cubical graph

Thursday, 22 September 2022 10:20 (20)

We introduce a new operator representing the three-dimensional scalar curvature in loop quantum gravity. The classical starting point of our construction is to express the Ricci scalar directly as a function of the Ashtekar variables. The construction does not apply to the entire Hilbert space of loop quantum gravity; instead, the operator is defined on the Hilbert space of a fixed cubical graph. As such, the operator is relevant to approaches such as algebraic quantum gravity, quantum-reduced loop gravity and models of effective dynamics. (Jerzy Lewandowski, Ilkka Mäkinen, arXiv:2110.10667)

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