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A. García-Quismondo: Polymeric quantisation of the interior of a Schwarzschild black hole

Monday 19 December 2022 15:30 (15 minutes)

In this talk, I will present some recent results concerning the loop quantisation of the interior region of a Schwarzschild black hole within the framework of loop quantum cosmology and a preliminary study of the physical states of the quantum theory. We start from a classical canonical description based on an extension of the phase space of Kantowski-Sachs cosmologies. Following the programme of loop quantum cosmology, we find a quantum representation of the holonomy-flux algebra and promote the constraints of the system to quantum operators on a kinematical Hilbert space. Then, assuming certain reasonable spectral properties for the involved operators, we formally discuss the expression of the physical states annihilated by the constraint operators, which turn out to be completely characterised by a wave function of the black hole mass with support on a very specific set. Finally, we comment on the conditions that guarantee the existence of physical states that describe very massive black holes.

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