

# Quantum corrected Friedmann equations from loop quantum black holes entropy-area relation

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## ABSTRACT

*Based upon the holographic principle, Jacobson demonstrated that the space-time can be viewed as a gas of atoms with a related entropy given by the Bekenstein-Hawking formula [1]. Following this argument, Friedmann equations can be derived by using Clausius relation to the apparent horizon of Friedmann-Robertson-Walker (FRW) universe [2]. Loop Quantum Gravity is a propose to description of the spacetime behavior in situations where its atomic characteristic arises. Among these situations, the behavior of our universe near the Big Bang singularity is described by Loop Quantum Cosmology (LQC). However, a derivation of the LQC equations based on the Bekenstein bound is lacking. In this work, we obtain the quantum corrected Friedmann equations from the entropy-area relation given by loop quantum black holes (LQBH), setting a still absent connection between holographic and LQC descriptions of the cosmos. Connections with braneworld cosmology have been also addressed.*

## References

- [1] T. Jacobson, Phys. Rev. Lett. 75 (1995) 1260.
- [2] R. G. Cai and S. P. Kim, JHEP 0502 (2005) 050.