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The two way Bridge between Observations and Loop Quantum Cosmology

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Thanks to the spectacular observational advances since the 1990s, a 'standard model' of the early universe has now emerged. However, since it is based on quantum field theory in curved space-times, it is not applicable in the Planck regime. Using techniques from loop quantum gravity, the theory can be extended over the 12 orders of magnitude in density and curvature from the onset of inflation all the way back to the Planck regime, providing us with a candidate completion of the standard model. Contrary to a wide-spread belief, the resulting pre-inflationary dynamics can have observational consequences. Thus, two way bridge has now opened between observations and fundamental theory. The talk will provide a broad overview of these results.

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