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Progress in loop quantum gravity

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Loop quantum gravity brings a profound change to our understanding of the fundamental nature of the spacetime. It predicts a discrete quantum geometry which is a direct consequence of the underlying quantization procedure. The challenge then is to understand the way one obtains a classical spacetime from the quantum geometry, and whether quantum geometry can cure singularities present in the classical theory. We will review the progress made on these fundamental questions in the recent years. We will discuss the way discreteness in quantum geometry translates to an upper bound on the spacetime curvature in a variety of models and leads to a new paradigm for the early universe. We will then discuss insights obtained on generic resolution of spacelike singularities. We will also discuss some phenomenological implications and the possibility of observational signatures in the near future experiments.