Universe as the Laboratory of Fundamental Physics

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Our universe is one of the best testing grounds for the fundamental laws of physics in addition to particle accelerators and underground experiments, thanks to ever precise data from observational cosmology. We have learned that the universe today consists of atoms 5%, dark matter 27%, dark energy 68%, and neutrinos a few permilles. We do not know what dark matter and dark energy are. We even don't know why atoms exist at all. Circumstantial evidence suggests the universe was once smaller than 10^{-26}cm stretched to macroscopic size by cosmic inflation. We all came from quantum fluctuations during inflation. I discuss how we came to this mind-boggling picture and what we are doing to understand them all.

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