General Relativity and Quantum Cosmology

On the Origin of Gauge Symmetries and Fundamental Constants

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A statistical mechanism is proposed for symmetrization of an extra space. The conditions and rate of attainment of a symmetric configuration and, as a consequence, the appearance of gauge invariance in low-energy physics is discussed. It is shown that, under some conditions, this situation occurs only after completion of the inflationary stage. The dependence of the constants $\hbar$ and G on the geometry of the extra space and the initial parameters of the Lagrangian of the gravitational field with higher derivatives are analyzed.

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