Quantum Creation of Closed Universe with Both Effects of Tunnelling and Well

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Abstract: A new " twice loose shoe" method in the Wheeler-DeWitt equation of the universe wavefunction on the cosmic scale factor a and a scalar field φ is suggested. We analyze both the affections coming from the tunnelling effect of a and the potential well effect of φ, and obtain the initial values a_0 and φ_0 about a primary closed universe which is born with the largest probability in the quantum manner. Our result is able to overcome the " large field difficulty" of the universe quantum creation probability with only tunnelling effect. This new born universe has to suffer a startup of inflation, and then comes into the usual slow rolling inflation. The universe with the largest probability maybe has a " gentle" inflation or an eternal chaotic inflation, this depends on a new parameter q which describes the tunnelling character.

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