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Inflation in a Flat Universe

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Abstract: We started the evolution of a flat universe from a nonsingular state called prematter which is governed by an inflationary equation of state $P=(\gamma -1)\rho$, where γ represents the initial vacuum dominance of the universe. The evolution of the universe-except in the prematter era-is affected neither by the initial vacuum dominance nor by the initial expansion rate of the universe. On the other hand, present properties of the universe, such as the Hubble constant, age and density, are sensitive to the value of the temperature at the decoupling (T_m) . Over a range between $3\cdot 10^4$and $5\cdot 10^4$ K for T_m, our model predicts a value between 50 and 80 $Km\cdot s^{-1}\cdot Mpc^{-1}$ for the present value of the Hubble constant (H_0) . Assuming that the thermal history of the universe is independent from its geometry, the above range could be considered as a transition range for the decoupling temperature T_m.

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