

## Prologue

In February 11<sup>th</sup>, 2003, the cosmic data, spectacularly precise, collected by the team in charge of the WMAP satellite were front page news in the New York Times. Next year will see the 25<sup>th</sup> anniversary of the revolutionary theory of cosmic inflation. As it is well known, Alan Guth postulated in this theory a short period of extraordinary cosmic expansion at constant density taking place  $10^{-39}$ s after the Big Bang. The energy density at inflation should have been enormous compared with anything accessible with man made accelerators today.

In this book, the history of the twentieth century cosmology is viewed in perspective with the “inflationary” paradigm and with the new WMAP data in view. As it was to be expected, the cosmic data provided by WMAP in 2003 did vastly improve on the already spectacular data given by COBE in 1989.

Is there any alternative to “inflation” to cope with the increasingly precise cosmic data now available?

In a recent piece in “Physics Today” (August 2003, p. 50) Michel Riordan discusses fashions and facts in physics. He says: “I find difficult, however, to imagine how such a rigorous criterion of reality (experimental observation) could ever hold true for some of the fanciful ideas and constructs that have emerged in recent years from the minds of many theorists. How can we ever hope to work in everyday practice with such entities as superstrings, parallel universes, wormholes and phenomena (inflation?) that occurred before the Big Bang?” (Words in parenthesis are mine).

The word “paradigm” occurs frequently in the literature to describe “inflation”. But a “paradigm” is not a fact. It could become a fact provided that conclusive observational or experimental evidence discard any simpler alternative.

The final chapter in the present book discusses “inflation” in the light of WMAP’s data and rigorous criteria of reality. In fact, as shown in the Appendix, a quantitative estimate of the “age” of the universe as given by  $13.7 \pm 0.2$  Gyrs was anticipated (1998) within the framework of the pre-inflationary cosmological equations, in extremely good agreement with the “age” reported by WMAP (2003) as supported by “inflation” and “dark energy”.

The “age” anticipated (N. Cereceda, G. Lifante, J. A. Gonzalo, “Acta Cosmologica” Krakow, 2003) was obtained using the time dependent dimensionless parameters  $\Omega(t) = \rho(t)/\rho_c(t)$  and  $H(t)$ . On the other hand Guth estimate (A. Guth, “The Inflationary Universe”, 1997) was inconsistent, within error bars, with the “age” given by WMAP.

Inflation or no inflation, in physics “numbers decide” as Max Plank said in his Nobel Prize lecture, 2 June 1920. In the future, increased numerical precision will very likely decide between theoretical approaches of permanent value and merely fashionable theoretical approaches, as pointed out by Michael Riordan.

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