IS THE HIGGS MECHANISM KEEPING A GOOD λ DOWN?

Particle physicists have learned to accept the "God particle"[1]—the Higgs boson—as a mediator in the phase transitions that govern the electroweak asymmetries. The Higgs is thought to be a manifestation of vacuum energy that also provides the driving force in the inflationary phase of the universe.

Cosmologists have accepted an early inflation as a useful concept for explaining the flatness and causal connectedness of the present universe. While some of them look to the Higgs postulate as the controlling mechanism in the expansion of the universe, others—more phenomenologically inclined—have resurrected Einstein's cosmological constant λ as a significant term in the Friedmann equations that describe the dynamics of the expanding universe. The Higgs field and λ have their root in the same phenomenon, namely the energy of the quantum vacuum.

The prevailing Higgs mythology seems to have led many cosmologists to simply set λ to zero without regard to the consequences for the age and the density of the universe. The resulting "standard model" usually comes up with ages that are too low and densities that are too high compared with observations. In recent years, some nonstandard models[2–4] have been offered that use the high value (75–90) of the Hubble constant and do not seem to require nonbaryonic dark matter. Oddly enough, one of these models[4] leads to about the same unorthodox age (33×10^9 years) of the universe as the high-density model with which Edward Harrison[5] has recently challenged the "standard" model.

Even if Harrison's model may have been offered only as an exercise to foster "a cautious attitude toward current cosmological belief," it illuminates the inconsistencies in many current descriptions of the state of the universe. Of course, in the absence of a viable theory of quantum gravity we do not know how to link the cosmological constant to the Higgs field. Just the same, it appears worthwhile to adopt the phenomenological approach by building Friedmann models with both a zero and a nonzero cosmological constant that may be compared and falsified by observation.

What factors limit our ability to falsify such models? Why do most cosmologists suppress λ in favor of Higgs?

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Detecting Isotropy: To *c* or Not to *c*?

The NASA–Jet Propulsion Laboratory–Caltech experiment on the isotropy of c cited by Timothy P. Krisher (July 1993, page 15) is identical in principle to experiments reported in 1963 and 1964 by researchers at MIT[1] and in 1972 by R. Cialdea.[2] Particular note is taken of the Cialdea experiment since A. A. Tyapkin[3] showed that effort to be a *non sequitur*, because all such experiments, and there have been several others, yield a null result through the second order resulting from time dilation.

In an era of shrinking Federal research budgets it would seem inappropriate to add a sixth layer of expenditure, as proposed by JPL, that at best would further confirm the finding of Tyapkin.

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