The Universe creation temperature?

Osvaldo F. Schilling

Departamento de Física, UFSC, 88040-900, Florianópolis, SC. Brazil

Email: osvaldo.neto@ufsc.br

Abstract

In recent publications we have proposed a quantitatively successful model for the origin of baryons, which should condense from a state at 3.71 GeV energy. From the analysis of Cosmic Rays protons data we conclude that such level should provide a measure also of the temperature at protons formation (the origin of material Universe?), 4.3×10^{13} K.

This short note builds upon our recent publications [1-2]. We have proposed a field-theoretical model in which embryonic baryons are represented as loops of charge[1], which should condense from a parent state of energy U_0. The condensation should result from perturbations over that parent state, which we freely associated to a vacuum background. Here begins the similarities with the calculations related to the Casimir Effect. Those calculations require a Regularization procedure which also appears in our model, with a Riemann-Epstein Zeta function summation becoming necessary. The regularized sum converges and produces two fundamental resullts, namely, the relation between mass and magnetic moments for baryons, and a value for the energy level we call U_0, i.e., 3.71 GeV[1].

The following Figure 1 represents the energy flux profile of interstellar protons(corrected for the influence of the Sun magnetic field) measured by a space probe[3], plotted against the log of kinetic energy. Its shape is symmetric enough to allow the immediate determination of the average energy, which approximately coincides with the peak position, 2.7 GeV. Tsallis et al. [4] obtained 2.88 GeV by integration of a related set of data. Examples like this are well known. According to statistical mechanics this result indicates that under equilibrium conditions the energy per proton should match the average energy provided by the environment around them, which is usually represented in a temperature scale. The 2.7 GeV averaged kinetic energy confirms the exitence (at some initial instant of time, when equilibrium was reached) of a parent state at 2.7 plus 0.94 GeV (the proton rest mass) which produce the ~ 3.7 GeV predicted in [1].

If one associates the origin of protons with the origin of the “material” Universe (the origin of mass), one may convert 3.71 GeV to Kelvin and obtain 4.3×10^{13} K as the local temperature. This number is consistent with the estimated temperature for the quark-hadron transition, of about 1 GeV, after 1 microsecond time. Before that there would be only energy and widespread fields[5].

References:

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Figure1: Energy flux-profile of interstellar protons in Cosmic Rays[3], with average at approximately 2.7 GeV kinetic energy..