

Lifetime of C-Argon, the Muon

Prof. K.V.K. Nehru, Ph.D.

Larson states that the apparent lifetime of c-argon is the sum of its own proper lifetime and the time required for the conversion of the c-krypton rotations to massless neutrons.¹ This conversion of the cosmic type rotation, namely (3)-(3)-0 of c-Kr, to the material type rotation, $M \frac{1}{2}-\frac{1}{2}-0$ of massless neutron, involves two distinct steps: firstly, there is the “scalar inversion” resulting in the change of scalar direction, from the standpoint of the temporal zero (the initial level of negative rotation) to that of the spatial zero (the initial level of positive rotation), converting the (3)-(3)-0 rotations to the 1-1-0 rotation (along with the concomitant conversion of the rotational base). Secondly, there is a “splitting” phenomenon which results in two single rotating systems of the massless neutrons, $M \frac{1}{2}-\frac{1}{2}-0$, from the double rotating system of the above 1-1-0 rotation. Thus, the apparent lifetime of c-Ar comprises of the three components: (i) the proper decay time of the c-Ar, (ii) the inversion time and (iii) the splitting time.

1 The Decay Time

The proper lifetime of the c-Ar, τ_d , in the material environment is the one-dimensional lifetime, t_{1D} , which has been evaluated² at 1.233148×10^{-8} sec, Thus

$$\tau_d = t_{1D} \text{ sec.} \quad (1)$$

t_{1D} is also the unit of time that is relevant in the computation of the inversion and the splitting times.

2 The Inversion Time

It must be recalled that the two sectors of the physical universe—the material and the cosmic—are distinguished by the nature of the reference frames to which each belongs. The time-space region of our sector is reckoned from the standpoint of the stationary spatial frame of reference, while the space-time region of the cosmic sector is reckoned from the standpoint of the stationary temporal reference frame. The one-dimensional lifetime, t_{1D} , was evaluated from a consideration of the kinetics of the entry from the space-time region to the time-space region.

However, in the inversion of the rotational units of the cosmic type to those of the material type there is an additional factor to be taken into consideration. This is because, while the evanescent manifestation of a decaying c-atom in the material sector is analogous to the temporary sojourn of an alien visitor on tourist visa, the scalar inversion amounts to nothing less than a complete nationalization. The c-atom exists inside one natural unit of time, the “space region” of the space-time sector, whereas the material atom (or particle) exists inside one natural unit of space, the “time region” of the time-space sector. Consequently, the inversion of the c-atom involves the crossing of the unit time boundary as well as the unit space boundary. But since our observations and measurements are carried out in the time-space region, outside the unit space (time region), the additional factor we need to consider is that arising out of the crossing of the unit time boundary only.

¹ Larson, Dewey B., *Nothing But Motion*, North Pacific Publishers, Oregon, 1979, pp. 195-196.

² K.V.K. Nehru, “Lifetimes of C-Atom Decays,” *Reciprocity* XI(1), 1981, p. 34.

The total number of possible directions—the quantization of orientation, we may say—in the time region that the scalar effect of the rotation can take is calculated by Larson³ to be 156.44. Therefore, in the absence of any preferential direction, the probability p , that the scalar inversion takes place in a unit of time (i.e., t_{1D}) would be $1/156.44$.

But this number, 156.44, is specifically applicable to the time region motion only in relation to our spatial zero point of view, or the analogous case of the space region motion in relation to the temporal zero point of view. As already mentioned, the inversion of the negative rotations (3)-(3)-0 to the positive rotations 1-1-0 is tantamount to switching the viewpoint from the negative zero to the positive zero. Although this entails no change from the natural standpoint, it amounts to a shifting of 8 displacement units from the standpoint of our stationary reference system.⁴ In view of this 8 unit separation between the positive and negative zero points, the total number of possible orientations in the space region, namely 156.44 as reckoned from the negative zero standpoint, becomes 8×156.44 , when reckoned from the positive zero standpoint. Consequently, the probability of inversion, p , becomes $1/(8 \times 156.44)$.

Over and above these, there is a numerical amplification arising out of the fact that x units measured from zero speed in time are equivalent to $8-x$ units measured from zero speed in space. Thus, one unit of motion in time "... the smallest amount that can exist, is equivalent to seven units measured from the spatial zero..."⁵ Remembering that, whereas the previous factor 8 applies on the other side of the unit time boundary and therefore increases the total possibilities (i.e., reduces p), the factor 7 magnifies the motion on this side of the boundary and increases p . Thus we arrive at the value of the probability p , as $7/(8 \times 156.44)$.

Since p is the probability that the inversion takes place in unit time, the mean time required for the inversion event to complete is $1/p$. That is,

$$\tau_i = \frac{8 \times 156.4}{7} \times t_{1D} \quad \text{sec.} \quad (2)$$

3 The Splitting Time

The splitting of the double rotating system 1-1-0 (three dimensions) to two of the two-dimensional rotations $M \frac{1}{2}-\frac{1}{2}-0$ (four dimensions in all), involves one unit of time modified by the $4/3$ dimensional factor, that is $4/3 t_{1D}$. Were, it may be argued that since *after* the inversion from (3)-(3)-0 to 1-1-0 the motion has already crossed the unit speed boundary and arrived in the material sector proper, the time unit relevant is no longer the one-dimensional lifetime, t_{1D} (which is applicable during the transition only), but the natural unit of time, t_{nat} . However, why this is not correct will be apparent in a moment.

It must be realized that the 1-1-0 combination is inherently unstable from the probability considerations,⁶ whereas the massless neutron, $M \frac{1}{2}-\frac{1}{2}-0$, is a stable structure. Insofar as the scalar inversion from (3)-(3)-0 leads to the improbable pattern 1-1-0, the splitting time, τ_s is *negative*. This is the same thing as saying, in common parlance, that a more probable condition is realized *earlier* than a less probable one. This clarifies the reason why t_{1D} , and not t_{nat} , is the pertinent time unit in the splitting. The time computation concerning any event *after* the 1-1-0 event requires consideration of t_{nat} as the

3 Larson, Dewey B., *Nothing But Motion*, *op. cit.*, p. 154.

4 *ibid.*, p. 153.

5 Larson, Dewey B., *Quasars and Pulsars*, North Pacific Publishers, Oregon, 1971, p. 97-98.

6 Larson, Dewey B., *Nothing But Motion*, *op. cit.*, p. 142.

proper time unit since the event 1-1-0 marks the end of the inversion. But the M $\frac{1}{2}$ - $\frac{1}{2}$ -0 event is *before* the 1-1-0 event and thus the relevant time unit is still t_{1D} . Thus,

$$\tau_s = \frac{-4}{3} t_{1D} \text{ sec.} \quad (3)$$

Finally, from the relations (1), (2) & (3) above, we have the apparent lifetime of c-argon as

$$\begin{aligned} \tau &= \tau_d + \tau_i + \tau_s \\ &= \left[1 + \left(\frac{8 \times 156.44}{7} \right) - \frac{4}{3} \right] \times 1.233148 \times 10^8 \\ &= 2.2007 \times 10^{-6} \text{ sec.} \end{aligned} \quad (4)$$