Relation of anomalous magnetic dipole moments of leptons

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Abstract: The relation of anomalous magnetic dipole moments of three charged leptons is assumed.

Key words: Bošković, moment, lepton

Moments

Let's apply the known dimensionless value: \( a = 1 / (2\pi \alpha) = 0.00116140973 \)

Where \( \alpha = 137.035999084 \) is the inverse fine structure constant.

Let us perform the following transformation on the anomalous magnetic dipole moment of the charged leptons to obtain the values, \( x_i \):

\[
x_i = 1 / (a / a_i - 1), \quad i = (1, 2, 3)
\]

(1)

Where: \( a_i \) is the anomalous magnetic dipole moment for the first, second and third generations, i.e.: Electron, Muon and Tau particle, [2]

With intuition and more with understanding [1] we get:

\[
2(\ x_2 + x_3 ) \approx 1 - x_1
\]

(2)

Shown in:

<table>
<thead>
<tr>
<th>( a = 1 / (2\pi*\alpha) ) = 0,001161409733</th>
<th>( a_i )</th>
<th>( x_i = 1 / (a_i / a - 1) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>137,035999084</td>
<td>0,00115965218076</td>
<td>-660,810974421489</td>
</tr>
<tr>
<td>0,00115965218076</td>
<td>0,0011599999084</td>
<td>0,00116592091</td>
</tr>
<tr>
<td>0,0011599999084</td>
<td>0,00116592091</td>
<td>257,451592677528</td>
</tr>
<tr>
<td>0,00116592091</td>
<td>0,0011772121 (5)</td>
<td>73,453894533217</td>
</tr>
</tbody>
</table>

\[
2 \ ( x_2 + x_3 ) = 661,810974421491
\]

\[
1 - x_1 = 661,810974421489
\]

Assuming the accuracy of (2), the least known input data is for Tau, so let's calculate:

\[
x_3 = (1 - x_1) / 2 \cdot x_2
\]

(3)

That is, by applying (1) and arranging, we get:

\[
a_3 = a \ast (1 + 1/((1 - 1/ (a_2/a - 1))/2 - 1 / (a_2/a - 1))) = 0, 00117722114
\]

(4)
This is probably approximate because we didn’t take into account other influences that are most likely from Proton and W boson with a small correction in (2), for example for a proton it is, $x_4$:

<table>
<thead>
<tr>
<th>$i$</th>
<th>$a_i$</th>
<th>$x_4 = 1 / (a_i / \alpha - 1)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>Proton 1.79284735650 0.000648222</td>
</tr>
</tbody>
</table>

So, when that term is also included in (3), the correction for $x_3$ is obtained and then the difference for the value of $a_3$ to the tenth decimal place compared to the calculation without proton.

A special symmetry can be seen from the previous formulas, so in (4) we can replace the places with indices 2 and 3 and get:

$$a_2 = a * (1 + 1/ ((1 - 1/ (a_2 / \alpha - 1)))^2 - 1 / (a_3 / \alpha - 1))) = 0, 00116592091$$

From this symmetry, we can classify particles differently and say that: we have one member of the primary and two members of the secondary generation.

The transformation, (1) only made the calculation easier: then everything was returned to anomalous magnetic dipole moments.

It is to be expected that a similar transformation can be used for up types and for down types of quarks for which no measured data are available to me.

**Conclusion**

• The ratio of anomalous magnetic dipole moments of three charged leptons was determined, using Ruđer Bošković's Theory.

• Of course, it would be best to use [1] to determine the value for the electron, which I did not do, and which is considered: "the magnetic moment of the electron the most accurately verified prediction in the history of physics", [2], with which I'm not familiar with it.

**References:**
