The Unification of Torah and Science: Basic Principles and a Case Study on Electromagnetism

Part 18--God's Name and the Four Forces of Nature

Having discussed the creation of light as it relates to electromagnetism and the creation of man and physio-electromagnetism, we will soon proceed to discuss the Biblical origin of the dual particle-wave phenomenon of electromagnetism. First, however, we will outline in the table below how the four forces of nature, the strong nuclear force, the weak nuclear force, electromagnetism and gravity, relate to the four letters of God's essential Name, Havayah.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Force</th>
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<tbody>
<tr>
<td>Yud</td>
<td>Strong nuclear force</td>
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<tr>
<td>Hei</td>
<td>Electro-weak force</td>
</tr>
<tr>
<td>Vav</td>
<td>Electromagnetism</td>
</tr>
<tr>
<td>Hei</td>
<td>Gravity</td>
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</table>

The strong nuclear force is the force that overcomes the repulsion we would expect to find inside an atom that contains two protons, which, having positive electric charges, should naturally repel one another. We deduce from this that there must be a stronger force that holds the nucleus together, preventing the protons from repelling one another. This force is the strong nuclear force.

The electro-weak force is responsible for radiation (radioactivity) – another
phenomenon that takes place within the nucleus of the atom.

These two forces – the strong nuclear force and the electro-weak force – belong in the category of "the hidden things are for God, our God." Their very essence is that we cannot see them, since they are hidden inside the atom. These two forces thus correspond to the *yud-hei* of God's Name.

Electromagnetism corresponds to the *vav* of God's Name. Kabbalah teaches us that *vav* is often considered the most essential letter in the Name. The *vav* begins in *da'at*, the origin of electricity and extends to *yesod* (and *ateret hayesod*), the seat of magnetism, as explained above.

The final *hei* of God's Name is the gravitational force. When the correspondence between the four letters of God's Name and the four worlds is considered, the final *hei* corresponds to our world, the World of Action, therefore it is fitting that in this correspondence between the forces, it represents gravity, which we sense as the gravitation pull of our physical world, the earth.

According to M-Theory and other of the most recent GUT theories, all four forces originated in one force. For a split second of reality the temperature of the universe was so hot that everything was totally unified into one perfectly symmetrical force. As the universe began to cool and expand, the first split occurred in the forces and gravitation broke away from the other three, which
remained unified. The next symmetry break occurred between the strong nuclear force and the electro-weak force, which remained one with electromagnetism. The last symmetry break to occur was between the electro-weak force and electromagnetism became two distinct and separate forces.

In physics, since all forces function by exchanging elementary particles, two forces can be considered symmetrical when the conveying particles are identical. This means that when the temperature is extremely hot, the particles that convey the weak nuclear force are the same as the particles that convey the electromagnetic force.

Most of the cooling process took place before the first second of time had passed. Once the universe had cooled sufficiently for the electro-weak force to break apart from electromagnetism, the four forces as we know them today came into play.

"כִּלּ הַנִּכְרָא בְּשֵׁם יָוֵלַכְבּוֹדָי, בְּרָאתִיָּו, יִרְאתִיָּו, אֶפּ עַשִּׂיָּו

This verse from Isaiah (43:7)\(^1\) is saying that “everything which is called by My Name and for my Honor, I have created, fashioned and acted upon”. There are four elements to the structure of the verse, and the last, “acted on” is separated by the word, אֶפּ af.

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Quoted also at the end of Tractate Avot. \(^1\)
In reference to our Kabbalistic structure, this indicates that initially the four letters of Havayah were all united as one. In the verse that relates to the four worlds, we find that the three words relating to the three upper worlds, and therefore to the first three letters of God’s Name, are divided from the fourth word by the word af. This indicates that the World of Action in particular is most easily separated from the other three spiritual worlds. This makes it understandable why it would be the first to split from the other letters. After the first symmetry break, the three remaining forces are still in a state of symmetry in relation to themselves until the second split occurs; this time between the first letter, yud, and the remaining letters, hei and vav. Eventually, the universe cooled down sufficiently to allow the electro-weak force, represented by the upper hei, to divide from the vav, each letter thus becoming separate.

Translating this progression into numbers, we begin with the numerical value of the complete Tetragrammaton, 26, then 21 (the sum of the letters יִהְוָ), 11 (the sum of the letters ה-ו), and lastly, 6, the value of the remaining vav. The total sum of these four numbers equals 64, which is the total numerical value of Adam Chavah, thus we see how this progression, which relates to the creation of light, is also connected to the creation of man. The average value of each of these numbers is 64/4, which equals 16.
16 is the numerical value of the last three letters of God's Name, א-ו-ה, which would mean to unite the electro weak force and electromagnetism with gravitation. It is also the numerical value of י-ו, which would mean to unite the strong nuclear force with the electromagnetic force. These are indications for ideas that scientists could investigate on the basis of our Kabbalistic insights.

That being as it may, if we expand this series of four numbers, by taking the finite differences between them and creating a cubic progression, we discover an amazing mathematical phenomenon. The number on both sides of the sequence is also exactly 16, which, as we have noted is the average value of each of the four numbers in the original sequence! The four numbers of our original sequence are the only numbers in the series that are out of symmetry in the entire series!

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\begin{array}{cccccccc}
51 & 16 & 26 & 21 & 11 & 6 & 16 & 51 \\
35 & 10 & -5 & -10 & -5 & 10 & 35 \\
-25 & -15 & -5 & 5 & 15 & 25 \\
10 & 10 & 10 & 10 & 10 & 10 \\
\end{array}
\]