ACHIEVING THE "GOLDEN RATIO" BY GROUPING THE "ELEMENTARY" PARTICLES

J. WLODARSKI
Porz-Westhoven, Federal Republic of Germany

"The mystery presented by the multiplicity of 'elementary' particles seems to be rapidly reaching a climax and perhaps even a solution. The idea is gaining ground that all the known particles can be grouped into a few large families and that within each of these 'supermultiplets' all the particles can be regarded as the mathematical equivalents of one another."

This has recently been published in a scientific magazine [1].

As a matter of fact, supermultiplets of 35 or 56 members can accommodate most of the well-established particles.

A 35-member family can be formed by grouping 17 of the known mesons that have negative parity. Eight of these particles: the pion (π) triplet, the kaon (κ) quartet and the eta (η) singlet have a spin of zero, and therefore only one spin state each (0).

The following nine mesons: the rho (ρ) triplet, the phi (φ) singlet, the omega (ω) singlet and another kaon quartet have a spin of one, or three spin states each (-1, 0 +1).

The total is $8 \times 1 + 9 \times 3 = \underline{35}$ spin states.

A 56-member family consists of the known 56 baryons or 56 antibaryons. They have positive parity. Eight of these particles: the proton-neutron (or nucleon) doublet, the lambda (Λ) singlet, the sigma (Σ) triplet and the xi (Ξ) doublet have a spin of 1/2, and therefore two spin states each (+1/2, -1/2).

The following ten particles: the delta (Δ) quartet, another sigma triplet, another xi doublet and the omega (Ω) singlet have a spin of 3/2, or four spin states each (+3/2, +1/2, -1/2, -3/2).

The total is $8 \times 2 + 10 \times 4 = \underline{56}$ spin states.

It has already been reported that as well as in the world of plants, some ratios in the world of atoms yield approximately the value of the "golden ratio" [2,3].

Now it has turned out that by grouping the "elementary" particles, the ratio of two "magic" numbers – spin states of the "elementary" particles also yields a near value of the "golden ratio."

As a matter of fact, the ratio of 35/56 is 0.625 and differs from the "golden ratio" value by 0.007 only.

REFERENCES

1. "Extended Symmetry," Scientific American, Vol. 212 (March 1965), pp. 52-54.
2. J. Wlodarski, "The 'Golden Ratio' and the Fibonacci Numbers in the World of Atoms," The Fibonacci Quarterly, Vol. 1, Number 4 (1963), pp. 61-63.
3. J. Wlodarski, "The Fibonacci Numbers and the 'Magic' Numbers," The Fibonacci Quarterly, Vol. 3, Number 3 (1965), p. 208.

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CORRECTION

On "Relations Involving Lattice Paths and Certain Sequences of Integers," Vol. 5, No. 1, pp. 81-86, Fibonacci Quarterly, please add the following:
"Work on this paper was supported in part by the Coordinating Board of the Texas College and University System."
Also, please change the author's name on p. 81 from David to Douglas.

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