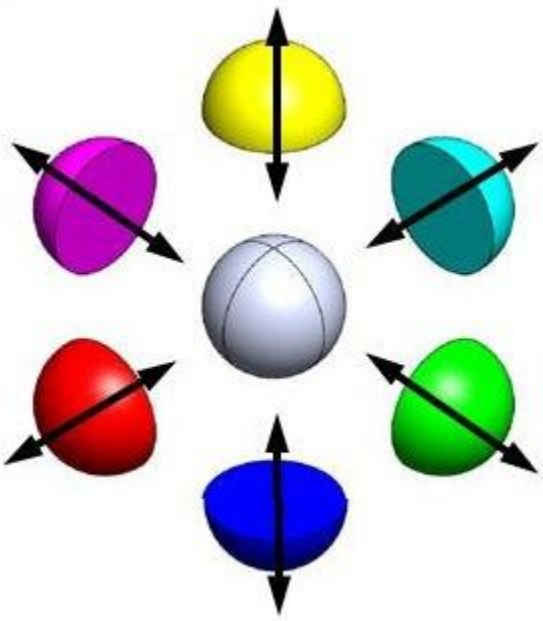
A geometrical model for energy exchange

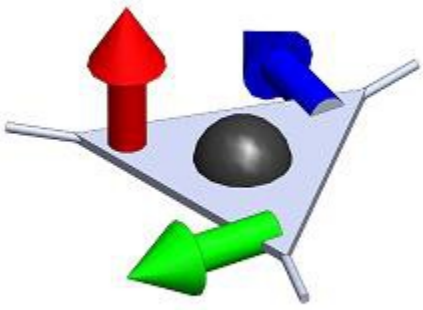
Gudrun Kalmbach H.E.

The model MINT-WIGRIS did evolve from mathematical quantum structure research. As a review is added here for medical research:

there are three spherical 2-dimensional ball-boundaries available, arising in the nano range for nucleons and atomic kernels. The strong nuclear interaction has a toroidal, higher dimensional product geometry of a 3-dimensional with a 5-dimensional sphere. The model works with projective geometry: The 5-dimensional part is normed to the hedgehog sphere, carrying for energy exchanges of a nucleon with its environment on its boundary six energy vectors, involved in the Heisenberg uncertainties.



The 3-dimensional part is a rotor as a Gleason operator which is more general for measurments of a physical system when being measured or used as a measuring apparatus where a metrical scale produces an output for the measurement. If the nano system itself is measured it can change its state.



The third sphere belongs to the weak interactions Hopf geometry for Euclidean and Minkowski spacetime coordinates with spin. It projects the weak 3-dimensional sphere down to a 2-dimensional sphere, a ball surface for atomic kernels. For leptons the sphere is demonstrated by the following geometries: in the first

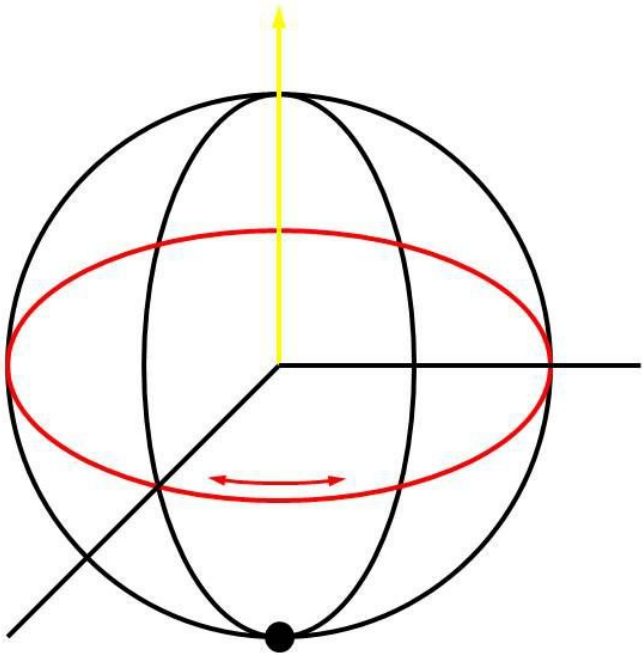
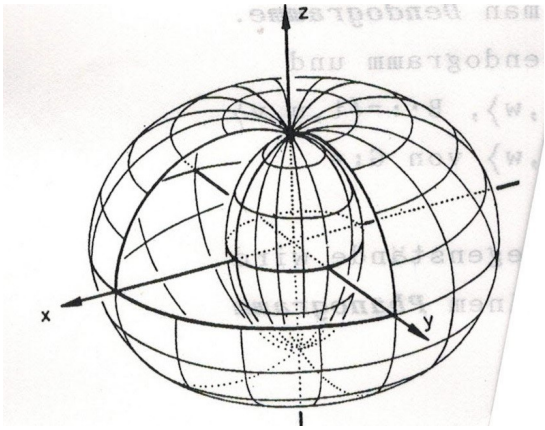
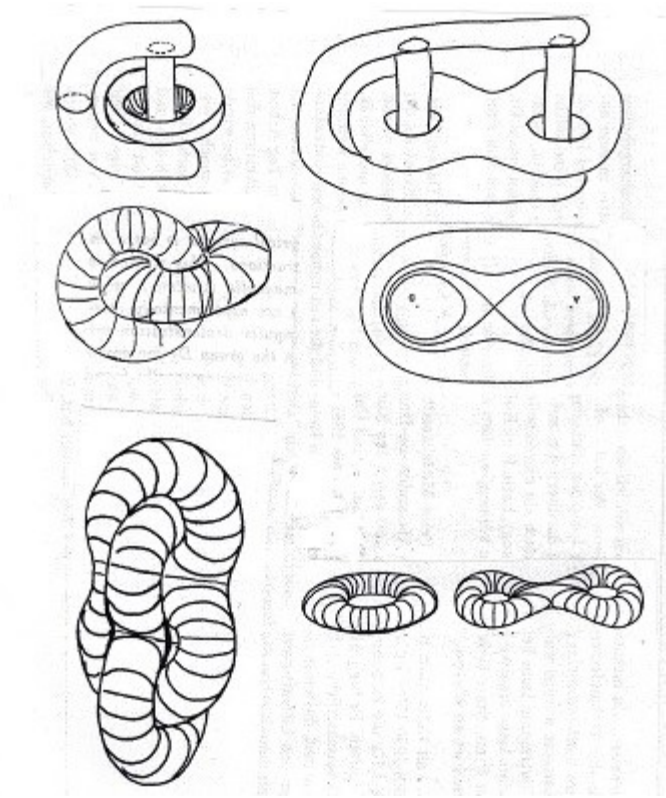


figure for leptons, an electrical charge rotates on a latitude circle. In the second figure below, neutral leptons as spindle torus with helicity is shown. The next figure is for the Minkowski light cone, a finite cylinder closed by a point to a Horn torus, below a photons cylinder as helix line.



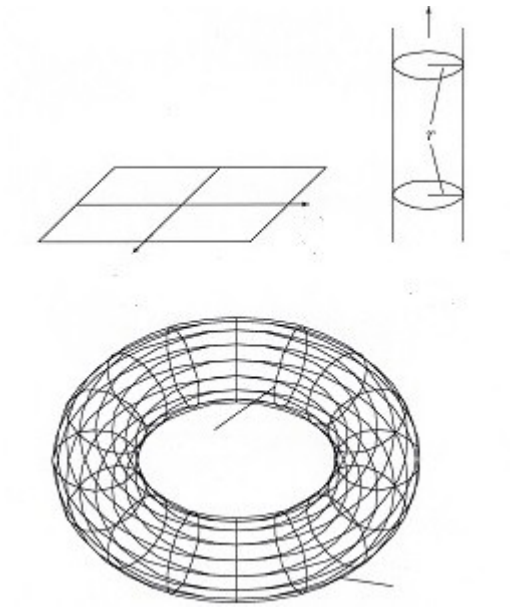


In a 3-dimensional Hopf blow up, a circle as the one in the electrical charged sphere above becomes a torus. The Hopf inverse map has for leptons charges as images toroidal surfaces in different shapes.

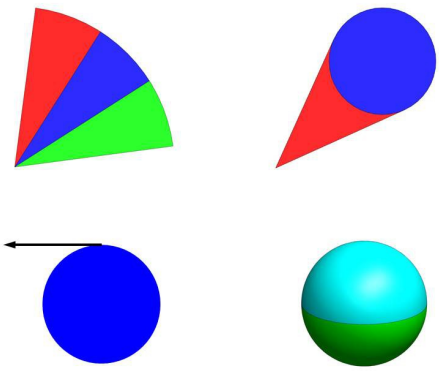


Beside the torus is a brezel of genus 2 for quarks geometry at the lower right. The other figures at left and top are Heegard splittings of a weak 3-dimensional sphere into two solid parts for fermions.

In both cases of nucleons and atomic kernels, mass defects and binding energies arise, for nucleons the u-quark defect, - for atomic kernels the neutron defect. For atoms the eletrons mass defect can be used for generating a common group speed of an atoms electrons as de Broglie matter wave with the atomic kernel. The functional wave description through exponential functions allows fundamental domains where the functions period generates first in a plane strips, rolled to a cyclinder as in the figure below, and for double periods the fundmental domain is a rectangle rolled to a torus.



The three Heisnberg uncertainties can be interpreted in this model as three MW-quantizations: for the last figure – waves – physics uses the position-momentum uncertainty; in the hedgehog figure the color charge vectors red and redbar on the x-axis from front to back in the horizontal plane. A second quantization of physics is not used here. Instead a time quantization through chronons is the MW-quantization for the weak interaction which has a compass rotor using the third weak isospin exchange between the two nucleon states of a paired proton and neutron in an atomic kernel. In the hedgehog figure the color charge vectors blue and yellow (bluebar) are on the vertical z-axis. The third angle-angular momentum MW-quantization (horizontal y-axis in the hedgehog figure with color charges green, greenbar) is for the strong rotor of the second figure in this article. It involves the representation of rgb-graviton whirls as superposition of three color charges which are detected as the neutral color charge of baryons like the nucleons. The quark triangle belongs to this which has the rotor symmetry group of permuting three quarks. There are three, not only two energy characters: wave, particle as in physics duality and MW added the rgb-gravitons whirl character. It arises in many other instances in electricity or gravity too. The MW-theory is published in a forthcoming book of the author.



The figure shows three fundamental domains of a flat compass having six segments for the strong interactions color charges, rolled together to a conic whirl. In the second line the circular whirl rotation is shown which has two possible orientations. At lower right two color charge cones are identified at their boundary to a gluon. The triangle symmetry of order 6 allows superpositions of color charge whirls for 2, 3 or 6 color charges.

Literature: G. Kalmbach H.E., *MINT-WIGRIS*, 2017 to appear

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