

539.00 Quantum Wave Phenomena

539.01 We say that Universe is design and that design is governed exclusively by frequency and angular modulations, wherefore the "angle" and "frequency" must be discretely equatable with quantum mechanics which deals always synergetically with the totality of Universe's finite energy.

539.02 The relative acutenesses and the relative obtusenesses of the angle and frequency modulating must relate discretely to the relative mass experienciabilities of Universe.

539.03 Quantum wave phenomena's *omni-wholeness* of required a priori accountability and persistent consideration is always systematically conceivable as a sphere and may be geodesically fractionated into great-circle-plane subsets for circular plane geometry considerability. Quantum waves always complete their cycles (circles). The circle can be divided into any number of arc increments as with the teeth of a circular gear—many little teeth or a few big teeth. In quantum wave phenomena we may have a few big, or many small, differentiated events, but they always add up to the same whole.

539.04 The rate of angular change in a big wave is very much slower than the rate of angular change in a small wave, even though they look superficially to be the same forms—as do two circles of different size appear to be the same form. The difference in the wave that is big and the wave that is small, is always in relation to the dimensioning of the observer's own integral system, and determines the discrete difference (i.e., the "relativity") of the wave angle.

539.05 What is "the most economical relationship" or "leap" between the last occurred event and the next occurring event? It is the chord (identifiable only by central angle) and the rate of the central-angle reorientation-aiming most economically toward that event, which is the angular (momentum) energy change involved in the angular and frequency modulation of all design of all pattern integrity of Universe.

539.06 Let us say that you are progressively leaping—"pacing" —around the perimeter of two circles: one small, six feet in diameter; the other large, 600 feet in diameter, leaping clockwise as seen from above. You are six feet long—"tall." On the small circle you will be turning, or angularly reorienting your direction to the right, much more obtusely in relation to your last previous direction of leap-accomplished facing and pacing.

539.07 Your rate of angular change in direction will be apprehendable in relation to the angles and overall direction of "you," as the observer, and as the criteria of the "rate of angle modulation."

539.08 Newton's first law: A body persists in a straight line except as affected by other bodies. But the 1974 era of physics' discoveries of "prime otherness" must add to Newton that: All bodies are always being affected by other bodies, and the intereffects are always precessional. The intereffects are angular-momentum aberrating. The angular momentum alterations are all determined by the angle and frequency modulating.

539.09 We may think of our leaps as describing the circular chords between the successive circular circumference points leaped-to. With our relative leap-size taken as that of our height—six feet—the chord of "our self" — either leaping around or lying down—in a small circle will represent the chord of the arc of a much larger central angle than it would constitute in respect to a large circle. The relative *angular difference* is that of the respective central angle changes as subtended by each use of self (the observer) as the chord of a circle of given size. This ground-contact-discontinuing chordal "leap" of self relates to quantum mechanics employment in experimental physics wherein no absolute continuum is manifest.

539.10 If a six-foot man lies down in a six-foot circle he becomes the diameter and the central angle is 180 degrees. If a six-foot man lies down in a 600-foot-diameter circle, he will be a chord subtending a central angle of approximately one degree—a chord whose arc altitude is so negligible that the observing self's height of six-feet will be a chord so relatively short as to lie approximately congruent with the one-degree arc of the circle. When the relative circle size in respect to the observer is of macro-differential magnitudes, such as that of the circumference of the galactic system in respect to each planet observer, then the central-angle magnitude of the subtended macrocosmic arc becomes undetectable, and the astronomer and navigator assume parallelism—parallax—to have set in, which produces a constant factor of error which must be incorporated in mathematical formulation of system descriptions. In quantum accounting and analysis of energy events and transformative transactions, this parallelism separates one quantum tetrahedron from its three surrounding tetrahedra.

540.00 **Frame of Reference**

540.01 The system generates itself whenever there is an event. The system actually regenerates itself: it is an eternal rebirth system.

540.02 The octet truss is not a priori. The octet truss is simply the most economical way of behaving relative to unity and to self. The octet truss is the evolutionary patterning, intervectoring, and intertrajectory-ing of the ever-recurrent 12 alternative options of action, all 12 of which are equally the most economical ways of self-and-otherness interbehaving—all of which interbehaviors we speak of as Universe.

540.03 Starting with whole Universe as consisting always of *observer* plus the *observed*, we can subdivide the unity of Universe. In synergetics—as in quantum mechanics—we have multiplication only by division.

540.04 I do not like the word *frame*. What we are talking about is the multi-optioned omni-orderly scheme of behavioral reference; simply the most economic pattern of evolvment. Pattern of evolvment has many, many equieconomical intertransformability options. There are many transformation patterns, but tetrahedron is the absolute minimum limit case of structural system interself-stabilizing. A tetrahedron is an omnitriangulated, four-entity, six-vector interrelationship with system-defining insiderness and outsiderness independent of size; it is not a rigid frame and can be any size. "Rigid" means "sized"—arbitrarily sized. "Rigid" is always special-case. Synergetics is sizeless generalization.

540.05 Synergetics is not a frame at all, but a pattern of most omnieconomic (ergo, spontaneous) interaccommodation of all observed self-and-otherness interexperiencing (ergo, geodesic—geodesic being the most economical interrelationships of a plurality of events).

540.06 Prime otherness demands identification of the other's—initially nebulous—entity integrity, which entity and subentities' integrities first attain cognizable self-interpatterning stabilization, ergo, discrete considerability, only at the tetrahedron stage of generalizable entity interrelationships. Resolvability and constituent enumerability, and systematic interrelationship cognition of entity regeneration presence, can be discovered only operationally. (See Secs. [411.00](#), [411.10](#), [411.20](#), and [411.30](#).) After the four-ball structural interpatterning stability occurs, and a fifth ball comes along, and, pulled by mass attraction, it rolls into a three-ball nest, and there are now two tetrahedra bonded face-to-face.

540.07 Because of discontinuity, the otherness points and subpoints may be anywhere. We start always with any point—event points being as yet noncomprehended; ergo, initially only as an apprehended otherness entity. Synergetics, as a strategy of converting apprehension to discrete comprehension, always proceeds vectorially.

540.08 The only difference between experience and nonexperience is time. The time factor is always radial, outwardly, inwardly, and chordally around; always accounted only in most economical to self-experience, energy time relationship (i.e., geodesic) units. The vector is time-energy incrementation, embracing both velocity and relative mass, as well as the observer's angulation of observation—strictly determined in relation to the observer's head-to-toe axis and time, relative, for instance, to heartbeat and diurnal cyclic experience frequencies.

540.09 A vectorial evolvment in no way conforms to a rigid rectilinear frame of the XYZ coordinate analysis which arbitrarily shuns most economical directness and time realizations—by virtue of which calculus is able only awkwardly to define positions rectilinearly, moving only as the chessman's knight. Nature uses rectilinear patterns only precessionally; and precession brings about orbits and not straight lines.

540.10 **Prime Vector**

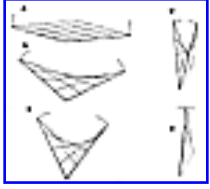
540.11 All structural accounting of nature is accomplished with rational quantities of tetrahedra. The XYZ coordinates may be employed to describe the arrangements, but only in awkward irrationality, because the edge of the cube is inherently irrational in respect to the cube's facial diagonal. The hypotenuses actually function only as the edges of the positive and negative tetrahedra, which alone permit the cube to exist as a structure. The hypotenuses connect the sphere centers at the cube corners; they function concurrently and simultaneously as the natural structuring of tetrahedra edges in the omnidirectional isotropic vector matrix; as either hypotenuse or tetra edge they are *prime vectors*.

540.12 Of the eight corners of the cube only four coincide with the sphere centers of closest-packed, unit-radius spheres; therefore only the cube's facial diagonals can interconnect closest-packed spheres. One closed set of six cube-face diagonals can interconnect only four sphere-center corners of the prime tetrahedron, which alone provides the structural stability of the cube, whose eight-cornered, structural-stability completeness requires the saturation of the alternate set of six diagonals in each of the cube's six faces. This alternate set of six diagonals intertriangulates the other four sphere centers of the cube's eight corners. The cube diagonals and the edges of the tetrahedra structuring the cube are two aspects of the same phenomenon. The tetra-edge, cube-face diagonals connecting the two sets, of four corners each, of the cube's total of eight corners are the *prime vectors* of the vector equilibrium and of the isotropic vector matrix.

540.13 The second power of the length of the prime vector that constitutes the diagonal of the cube's face equals the sum of the second powers of any two edges of the cube. Because these two edges converge at the cube's corner to form one standing wave that may be multifrequenced to apparently coincide with the cube's facial diagonal, we discover that this relationship is what we are talking about in the deliberately nonstraight line. It is the same mathematical relationship demonstrated in the ancients' proof of the Pythagorean theorem, wherein the square of the hypotenuse is proven to be equal to the sum of the squares of the triangle's two legs. Thus the deliberately nonstraight line displays an evolutionary transformation from coincidence with the two sides of the parallelogram to coincidence with the seemingly straight, wavelinear diagonal of the parallelogram.

540.14 Prime vector may be considered variously as:

- the axis of intertangency (Secs. [521.21](#) and [537.22](#));
- the control line of nature (Sec. [982.21](#));
- the deliberately nonstraight line (Sec. [522](#));
- the diagonal of the cube (Sec. [463](#));
- diametric unity (Sec. [986.160](#) and Fig. [986.161](#));
- half-vectors (Sec. [537.21](#));
- the hypotenuse (Sec. [825.26](#));
- the internuclear vector modulus (Sec. [240.40](#));
- the line of interrelationship (Secs. [505.74](#) and [505.82](#));
- the line between two sphere centers (Sec. [537.21](#));
- linear mensuration unity (Sec. [982.51](#));
- the radial line (Sec. [537.21](#));
- the T Quanta Module edge;
- the tetra edge (Sec. [982.53](#));
- unit radius (Sec. [1106.23](#)).



540.30 **Four-frequency Hyperbolic Paraboloid**

[Fig. 540.30](#)

540.31 A flat, four-sided frame (A) can be folded to define a nonplanar hyperbolic paraboloid (B, C, D).

540.32 The edges of the four-sided frame are joined with lines parallel to its edges. This forms the basic grid of the hyperbolic paraboloid. When the frame is in planar position (A), all the grid lines are of equal length. As opposite vertices of the frame are lifted, the grid lines change lengths at unequal rates. Figure [540.30](#) is a four-frequency system that in closed position (E) reveals there are two different cross-lengths in addition to the length of the frame edge. Although the lengths shorten as the altitude increases, there are always only two different cross-lengths for a four-frequency hyperbolic paraboloid. The moment the four-sided frame is no longer planar, the fact of two different axis lengths is revealed.

540.40 **Multidimensional Accommodation**

540.41 Vectors, like all real experiences, are inherently terminal. The relative lengths of the vectors are the products of the mass and velocity of the energy events, as expressed in unified scale in relation to other co-occurring energy events. All co-occurring vectors have unique angles of direction as angularly referenced multidimensionally to a given observer's system axis, spin orientation, and system-orbit direction at the time of observation. All angularly referenced relationships inherently involve fourth-dimensional accommodation (and fifth-power accommodation, when referenced to the cosmic scenario). These relationships can be conceptually comprehended in synergetics but can be expressed only in complex formula terms in the XYZ-CG_t S system.

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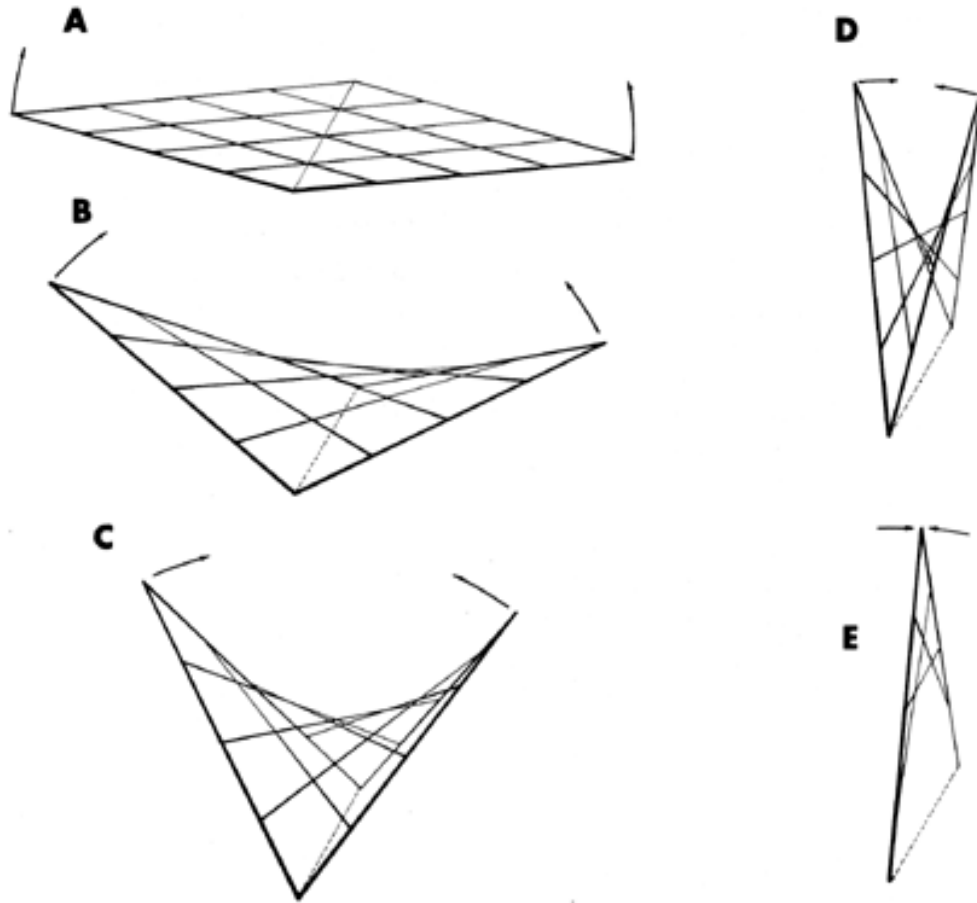


Fig. 540.30 Hyperbolic Paraboloid: There are always only two different cross-lengths for a four-frequency hyperbolic paraboloid. As opposite vertexes of the frame are lifted, the grid lines change length at unequal rates. The moment the four-sided frame is no longer planar, the fact of two different axis lengths is revealed.