1033.180 **Vector Equilibrium: Potential and Primitive Tetravolumes**

1033.181 The potential activation of tetravolume quantation in the geometric hierarchy is still subfrequency but accounts for the doubling of volumetric space. The potential activation of tetravolume accounting is plural; it provides for nucleation. Primitive tetravolume accounting is singular and subnuclear.

1033.182 When the isolated single sphere's vector equilibrium of tetravolume 2 l/2 is surrounded by 12 spheres to become a nuclear sphere, the vector equilibrium described by the innermost-economically-interconnecting of the centers of volume of the 12 spheres comprehensively and tangentially surrounding the nuclear sphere—as well as interconnecting their 12 centers with the center of the nuclear sphere—has a tetravolume of 20, and the nuclear group's rhombic dodecahedron has a tetravolume of 48.

1033.183 The tetravolume-6 rhombic dodecahedron is the domain of each closest- packed, unit-radius sphere, for it tangentially embraces not only each sphere, but that sphere's proportional share of the intervening space produced by such unit-radius-sphere closest packing.

1033.184 When the time-sizing is initiated with frequency^2, the rhombic dodecahedron's volume of 6 is eightfolded to become 48. In the plurality of closest- packed-sphere domains, the sphere-into-space, space-into-sphere *dual* rhombic dodecahedron domain has a tetravolume of 48. The total space is 24—with the vector equilibrium's Eighth-Octahedra extroverted to form the rhombic dodecahedron. For every space there is always an alternate space: This is where we get the 48-ness of the rhombic dodecahedron as the macrodomain of a sphere:

$$2\ 1/2 \times 8 = 20$$

$$6 \times 8 = 48$$

1033.185 The 12 spheric domains around one nuclear sphere domain equal 13 rhombic dodecahedra—nuclear 6 + (12 × 6) = tetravolume 78.

1033.192 **Table: Prime Number Consequences of Spin-halving of Tetrahedron's Volumetric Domain Unity**

	Tetravolumes:	*Great Circles:*
Vector Equilibrium As Zerovolume Tetrahedron:	0 = +2 l/2, -2 l/2, -2 l/2, +2 l/2, (with plus-minus limits differential of 5) ever-	4 complete great circles, each fully active
eternally congruent intro-extrovert domain	inter-self-canceling to produce zerovolume tetrahedron	
Tetra: eternally incongruent	+ 1 (+ 1 or -1)	6 complete great circles, each being 1/3 active, vector components
Octa:	2 (2 × 2 = 4)	2 congruent (1 positive, negative) sets of 3
eternally congruent yet nonredundant, complementary positive-negative duality		great circles each; i.e., a total of 6 great circles but visible only as 3 sets
Duo-Tet Cube:	3 "cube"	6 great circles 2/3 active
intro-extrovert tetra, its vertexially defined cubical domain, edge-outlined by 6 axes spun most-economically-interconnected edges of cube		
Rhombic Triacontahedron: 1 × 2 × 3 × 5 = 30	5 "sphere" both statically and dynamically the most spheric primitive system	15-great-circle-defined, 120 T Modules

Rhombic Dodecahedron:	6 closest-packed spheric domain	12 great circles appearing as 9 and consisting of 2 congruent sets of 3 great circles of octa plus 6 great circles of cube
Vector Equilibrium: nuclear-potentialed	20 (potential)	4 great circles describing 8 tetrahedra and 6 half-octahedra

1033.20 **Table: Cosmic Hierarchy of Primitive Polyhedral Systems:** The constant octave system interrelationship is tunable to an infinity of different frequency keys:

		Active Tetravolumes
Always and only co-occurring	Convergent Tetrahedron (Active: now you see it) Divergent Tetrahedron (Passive:now you don't)	
	Infratunable microcosmic zero (Four great-circle planes as zerovolume tetrahedron)	0
	Convergent-divergent tetrahedron, always and only dynamically coexisting, unity is plural and at minimum two: active or passive	1

	Vector-diameter vector equilibrium: congruently 2 1/2 convergent and 2 1/2 divergent		2 1/2
The Eight Tunable	Duo-tet Cube, start-tetra geodesic cubic domain: 1 1/2 passive and 1 1/2 active		3
Octave "Notes"	Octahedron as two passive tetra and two active tetra		4
	Vector-radius rhombic triacontahedron		5+
	Rhombic dodecahedron		6
	Vector-radius vector equilibrium		20
	Vector equilibrium plus its external octahedron		24
	Sphere-into-space-space-into-sphere dual rhombic dodecahedron domain		48
	Ultratunable macrocosmic zero	(Four great-circle planes as zerovolume vector equilibrium)	0

1033.30 **Symmetrical Contraction of Vector Equilibrium: Quantum Loss**

1033.31 The six square faces of the vector equilibrium are dynamically balanced; three are oppositely arrayed in the northern hemisphere and three in the southern hemisphere. They may be considered as three—alternately polarizable—pairs of half- octahedra radiantly arrayed around the nucleus, which altogether constitute three whole "internal" octahedra, each of which when halved is structurally unstable—ergo, collapsible—and which, with the vector equilibrium jitterbug contraction, have each of their six sets of half-octahedra's four internal, equiangular, triangular faces progressively paired into congruence, at which point each of the six half-octahedra—ergo, three quanta—has been annihilated.

1033.32 In the always-omnisymmetrical progressive jitterbug contraction the vector equilibrium—disembarrassed of its disintegrative radial vectors—does not escape its infinite instability until it is symmetrically contracted and thereby structurally transformed into the icosahedron, whereat the six square faces of the half-octahedra become mildly folded diamonds ridge-poled along the diamond's shorter axis and thereby bent into six ridge-pole diamond facets, thus producing 12 primitively equilateral triangles. Not until the six squares are diagonally vectored is the vector equilibrium stabilized into an omnitriangulated, 20-triangled, 20-tetrahedral structural system, the icosahedron: the structural system having the greatest system volume with the least energy quanta of structural investment—ergo, the least dense of all matter.

1033.33 See Sec. 611.02 for the tetravolumes per vector quanta structurally invested in the tetra, octa, and icosa, in which we accomplish—

Tetra = 1 volume per each quanta of structure

Octa = 2 volume per each quanta of structure

Icosa = 4 (approximate) volume per each quanta of structure

1033.34 This annihilation of the three octahedra accommodates both axial rotation and its linear contraction of the eight regular tetrahedra radiantly arrayed around the nucleus of the vector equilibrium. These eight tetrahedra may be considered as four—also alternately polarizable—pairs. As the axis rotates and shortens, the eight tetra pair into four congruent (or quadrivalent) tetrahedral sets. This omnisymmetrically accomplished contraction from the VE's 20-ness to the quadrivalent octahedron of tetravolume-4 represents a topologically unaccounted for—but synergetically conceptualized— annihilation of 16 tetravolumes, i.e., 16 energy quanta, 12 of which are synergetically accounted for by the collapse of the three internal octahedra (each of four quanta); the other four-quanta loss is accounted for by the radial contraction of each of the VE's eight tetrahedra (eight quanta) into the form of Eighth-Octahedra (each of a tetravolume of 2—ergo, 8 × 1/2 = 4 = a total of four quanta.

1033.35 The six new vector diagonals of the three pairs of opposing half-octahedra become available to provide for the precession of any one of the equatorial quadrangular vectors of the half-octahedra to demonstrate the intertransformability of the octahedron as a conservation and annihilation model. (See Sec. 935.) In this transformation the octahedron retains its apparent topological integrity of 6V + 8F = 12E + 2, while transforming from four tetravolumes to three tetravolumes. This tetrahelical evolution requires the precession of only one of the quadrangular equatorial vector edges, that edge nearest to the mass-interattractively precessing neighboring mass passing the octahedron (as matter) so closely as to bring about the precession and its consequent entropic discard of one quantum of energy—which unbalanced its symmetry and resulted in the three remaining quanta of matter being transformed into three quanta of energy as radiation.

1033.36 This transformation from four tetravolumes to three tetravolumes—i.e., from four to three energy quanta cannot be topologically detected, as the Eulerean inventory remains 6V + 8F = 12E + 2. The entropic loss of one quantum can only be experimentally disclosed to human cognition by the conceptuality of synergetics' omnioperational conceptuality of intertransformabilities. (Compare color plates 6 and 7.)

1033.40 **Asymmetrical Contraction of Vector Equilibrium: Quantum Loss**

1033.41 The vector equilibrium contraction from tetravolume 20 to the tetravolume 4 of the octahedron may be accomplished symmetrically (as just described in Sec. 1033.30) by altogether collapsing the unstable six half-octahedra and by symmetrical contraction of the 12 radii. The angular collapsing of the 12 radii is required by virtue of the collapsings of the six half-octahedra, which altogether results in the eight regular tetrahedra being concurrently reduced in their internal radial dimension, while retaining their eight external equiangular triangles unaltered in their prime-vector-edge lengths; wherefore, the eight internal edges of the original tetrahedra are contractively reduced to eight asymmetric tetrahedra, each with one equiangular, triangular, external face and with three right-angle- apexed and prime-vector-base-edged internal isosceles-triangle faces, each of whose interior apexes occurs congruently at the center of volume of the symmetrical octahedron—ergo, each of which eight regular-to-asymmetric-transformed tetrahedra are now seen to be our familiar Eighth-Octahedra, each of which has a volume of l/2 tetravolume; and since there are eight of them (8 × 1/2 = 4), the resulting octahedron equals tetravolume-4.

1033.42 This transformation may also have been accomplished in an alternate manner. We recall how the jitterbug vector equilibrium demonstrated the four-dimensional freedom by means of which its axis never rotates while its equator is revolving (see Sec. 460.02). Despite this axis and equator differentiation the whole jitterbug is simultaneously and omnisymmetrically contracting in volume as its 12 vertexes all approach their common center at the same radial contraction rate, moving within the symmetrically contracting surface to pair into the six vertices of the octahedron—after having passed symmetrically through that as-yet-12-vectored icosahedral stage of symmetry. With that complex concept in mind we realize that the nonrotating axis was of necessity contracting in its overall length; ergo, the two-vertex-to-two-vertex-bonded "pair" of regular tetrahedra whose most-remotely-opposite, equiangular triangular faces' respective centers of area represented the two poles of the nonrotated axis around which the six vertices at the equator angularly rotated—three rotating slantwise "northeastward" and three rotating "southeastward," as the northeastward three spiraled finally northward to congruence with the three corner vertices of the nonrotating north pole triangle, while concurrently the three southeastward-slantwise rotating vertices originally situated at the VE jitterbug equator spiral into congruence with the three corner vertices of the nonrotating south pole triangle.

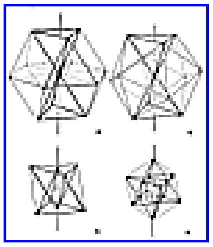
Fig. 1033.43

1033.43 As part of the comprehensively symmetrical contraction of the whole primitive VE system, we may consider the concurrent north-to-south polar-axis contraction (accomplished as the axis remained motionless with respect to the equatorial motions) to have caused the two original vertex-to-vertex regular polar tetrahedra to penetrate one another vertexially as their original two congruent center-of-VE-volume vertices each slid in opposite directions along their common polar-axis line, with those vertices moving toward the centers of area, respectively, of the other polar tetrahedron's polar triangle, traveling thus until those two penetrating vertices came to rest at the center of area of the opposite tetrahedron's polar triangle—the planar altitude of the octahedron being the same as the altitude of the regular tetrahedron. (See Figs. 1033.43 and 1033.47.)

1033.44 In this condition they represent the opposite pair of polar triangles of the regular octahedron around whose equator are arrayed the six other equiangular triangles of the regular octahedron's eight equiangular triangles. (See Fig. 1033.43.) In this state the polarly combined and—mutually and equally—interpenetrated pair of tetrahedra occupy exactly one-half of the volume of the regular octahedron of tetravolume-4. Therefore the remaining space, with the octahedron equatorially surrounding their axial core, is also of tetravolume-2—i.e., one-half inside-out (space) and one-half inside-in (tetracore).

1033.45 At this octahedron-forming state two of the eight vertices of the two polar- axis tetrahedra are situated inside one another, leaving only six of their vertices outside, and these six—always being symmetrically equidistant from one another as well as equidistant from the system center—are now the six vertices of the regular octahedron.

1033.46 In the octahedron-forming state the three polar-base, corner-to-apex-connecting-edges of each of the contracting polar-axis tetrahedra now penetrate the other tetrahedron's three nonpolar triangle faces at their exact centers of area.

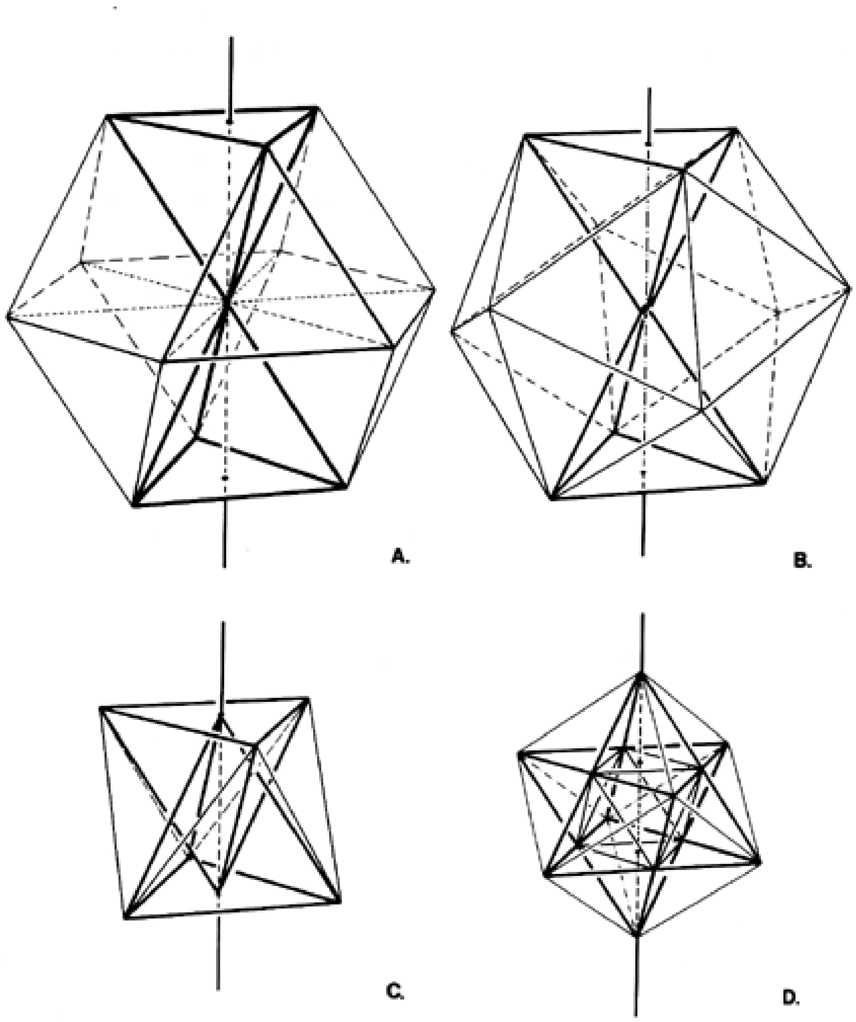

Fig. 1033.43 Two Opposite-Paired Tetrahedra Interpenetrate in Jitterbug Contraction: As one axis remains motionless, two polar-paired, vertex-joined tetrahedra progressively interpenetrate one another to describe in mid-passage an octahedron, at C, and a cube-defining star polyhedron of symmetrical congruence at D. (Compare Fig. 987.242A.)

1033.47 With this same omnisymmetrical contraction continuing—with all the external vertices remaining at equal radius from the system's volumetric center—and the external vertices also equidistant chordally from one another, they find their two polar tetrahedra's mutually interpenetrating apex points breaking through the other polar triangle (at their octahedral-forming positions) at the respective centers of area of their opposite equiangular polar triangles. Their two regular-tetrahedra-shaped apex points penetrate their former polar-opposite triangles until the six mid-edges of both tetrahedra become congruent, at which symmetrical state all eight vertices of the two tetrahedra are equidistant from one another as well as from their common system center. (See Fig. 987.242A.)

1033.48 The 12 geodesic chords omniinterconnecting these eight symmetrically omniarrayed vertices now define the regular cube, one-half of whose total volume of exactly 3-tetravolumes is symmetrically cored by the eight-pointed star core form produced by the two mutually interpenetrated tetrahedra. This symmetrical core star constitutes an inside-in tetravolume of l 1/2, with the surrounding equatorial remainder of the cube-defined, insideout space being also exactly tetravolume 1 1/2. (See Fig. 987.242A.)

1033.490 In this state each of the symmetrically interpenetrated tetrahedra's eight external vertices begins to approach one another as each opposite pair of each of the tetrahedra's six edges—which in the cube stage had been arrayed at their mutual mid- edges at 90 degrees to one another—now rotates in respect to those mid-edges—which six mutual tetrahedra's mid-edge points all occur at the six centers of the six square faces of the cube.

1033.491 The rotation around these six points continues until the six edge-lines of each of the two tetrahedra become congruent and the two tetrahedra's four vertices each become congruent—and the VE's original tetravolume 20 has been contracted to exactly tetravolume 1.

1033.492 Only during the symmetrical contraction of the tetravolume-3 cube to the tetravolume- 1 tetrahedron did the original axial contraction cease, as the two opposing axis tetrahedra (one inside-out and one outside-out) rotate simultaneously and symmetrically on three axes (as permitted only by four-dimensionality freedoms) to become unitarily congruent as tetravolume-1—altogether constituting a cosmic allspace- filling contraction from 24 to 1, which is three octave quanta sets and 6 × 4 quanta leaps; i.e., six leaps of the six degrees of freedom (six inside-out and six outside-out), while providing the prime numbers 1,2,3,5 and multiples thereof, to become available for the entropic-syntropic, export-import transactions of seemingly annihilated—yet elsewhere reappearing—energy quanta conservation of the eternally regenerative Universe, whose comprehensively closed circuitry of gravitational embracement was never violated throughout the 24 → 1 compaction.

1033.50 **Quanta Loss by Congruence**

1033.51 **Euler's Uncored Polyhedral Formula:**

	V + F = E + 2
Vector Equilibrium	12 + 14 = 24 + 2
Octahedron	6 + 8 = 12 + 2
Tetrahedron	4 + 4 = 6 + 2

1033.52 Although superficially the tetrahedron seems to have only six vector edges, it has in fact 24. The sizeless, primitive tetrahedron—conceptual independent of size—is quadrivalent, inherently having eight potential alternate ways of turning itself inside out— four passive and four active—meaning that four positive and four negative tetrahedra are congruent. (See Secs. 460 and 461.)

1033.53 The vector equilibrium jitterbug provides the articulative model for demonstrating the always omnisymmetrical, divergently expanding or convergently contracting intertransformability of the entire primitive polyhedral hierarchy, structuring as you go in an omnitriangularly oriented evolution.

1033.54 As we explore the interbonding (valencing) of the evolving structural components, we soon discover that the universal interjointing of systems—and their foldability—permit their angularly hinged convergence into congruence of vertexes (single bonding), vectors (double bonding), faces (triple bonding), and volumetric congruence (quadri-bonding). Each of these multicongruences appears only as one vertex or one edge or one face aspect. The Eulerean topological accounting as presently practiced—innocent of the inherent synergetical hierarchy of intertransformability—accounts each of these multicongruent topological aspects as consisting of only one of such aspects. This misaccounting has prevented the physicists and chemists from conceptual identification of their data with synergetics' disclosure of nature's comprehensively rational, intercoordinate mathematical system.

1033.55 Only the topological analysis of synergetics can account for all the multicongruent—doubled, tripled, fourfolded—topological aspects by accounting for the initial tetravolume inventories of the comprehensive rhombic dodecahedron and vector equilibrium. The comprehensive rhombic dodecahedron has an initial tetravolume of 48; the vector equilibrium has an inherent tetravolume of 20; their respective initial or primitive inventories of vertexes, vectors, and faces are always present—though often imperceptibly so—at all stages in nature's comprehensive 48 $\rightarrow$ 1 convergence transformation.

1033.56 Only by recognizing the deceptiveness of Eulerean topology can synergetics account for the primitive total inventories of all aspects and thus conceptually demonstrate and prove the validity of Boltzmann's concepts as well as those of all quantum phenomena. Synergetics' mathematical accounting conceptually interlinks the operational data of physics and chemistry and their complex associabilities manifest in geology, biology, and other disciplines.

1033.60 **Primitive Dimensionality**

1033.601 Defining frequency in terms of interval requires a minimum of three intervals between four similar system events. (See Sec. 526.23.) Defining frequency in terms of cycles requires a minimum of two cycles. Size requires time. Time requires cycles. An angle is a fraction of a cycle; angle is subcyclic. Angle is independent of time. But angle is conceptual; angle is angle independent of the length of its edges. You can be conceptually aware of angle independently of experiential time. Angular conceptioning is metaphysical; all physical phenomena occur only in time. Time and size and special-case physical reality begin with frequency. Pre-time-size conceptuality is *primitive* conceptuality. Unfrequenced angular topology is primitive. (See Sec. 527.70.)

1033.61 **Fifth Dimension Accommodates Physical Size**

1033.611 Dimension begins at four. Four-dimensionality is primitive and exclusively within the primitive systems' relative topological abundances and relative interangular proportionment. Four-dimensionality is eternal, generalized, sizeless, unfrequenced.

1033.612 If the system is frequenced, it is at minimum linearly five-dimensional, surfacewise six-dimensional, and volumetrically seven-dimensional. Size is special case, temporal, terminal, and more than four-dimensional.

1033.613 Increase of relative size dimension is accomplished by multiplication of modular and cyclic frequencies, which is in turn accomplished only through subdividing a given system. Multiplication of size is accomplished only by agglomeration of whole systems in which the whole systems become the modules. In frequency modulation of both single systems or whole-system agglomerations asymmetries of internal subdivision or asymmetrical agglomeration are permitted by the indestructible symmetry of the four- dimensionality of the primitive system of cosmic reference: the tetrahedron—the minimum structural system of Universe.

1033.62 **Zerovolume Tetrahedron**

1033.621 The primitive tetrahedron is the four-dimensional, eight-in-one, quadrivalent, always-and-only-coexisting, inside-out and outside-out zerovolume whose four great- circle planes pass through the same nothingness center, the four-dimensionally articulatable inflection center of primitive conceptual reference.

1 tetrahedron =	zerovolume
1 tetrahedron =	$1^{\text{alternately-in-and-out 4th power}}$
1 tetrahedron =	$1^{\text{1/2-and-l/2 8th power}}$
|><|=	the symbol of equivalence in the converging-diverging intertransforms
Tetrahedron = 1^4	|><| (<-This is the preferred notation for the four-dimensional, inside-out, outside-out, balanced mutuality of tetra intertransformability.)
	0 Zerovolume Tetra & VE
4 great circles =	Tetra & VE
3 great circles =	Octa
6 great circles =	Duo-tet Cube
12 great circles =	Rhombic Dodecahedron

1033.622 Thus the tetrahedron—and its primitive, inside-out, outside-out intertransformability into the prime, whole, rational, tetravolume-numbered hierarchy of primitive-structural-system states—expands from zerovolume to its 24-tetravolume limit via the *maximum-nothingness* vector-equilibrium state, whose domain describes and embraces the primitive, nucleated, 12-around-one, closest-packed, unit-radius spheres. (See cosmic hierarchy at Sec. 982.62.)

Next Section: 1033.63
