UFOT -- The Universal Force of Time

Covalent Radii from the Tau Lattice

r_N = 3x5^2 pm | r_O = R_Earth x (180/pi)/5000 | r_F = 2^6 pm | Six Propositions

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Tau (T) is the living fabric of time itself -- the sole substance of which all physical reality is composed. Every particle, force, wavelength, and conscious experience is a structured configuration of T-flow. There is no gravity, no electromagnetic force, no strong nuclear force as separate entities: all are registers of the single T-field operating across dimensional levels. The conservation law dST=0 governs all change: T is never created or destroyed, only redistributed.

Abstract

Every covalent atomic radius is a Tau-lattice projection: the spatial node at which the Tau-field imposes stability on electron-bond geometry. Nitrogen anchors the biological register exactly: r_N = 3x5^2 = 75 pm (0 ppm deviation). Fluorine occupies the pure {2} pole: r_F = 2^6 = 64 pm (0 ppm). Oxygen carries the Earth-veil factor: r_O = R_Earth x (180/pi) / 5000 = 73.087 pm (measured 73.000 pm, 1191 ppm). Heavier elements approach {2,3,5} nodes from the prime-adjacent side with deviations under 3%. Six propositions P-COV-1 through P-COV-6 formalise the covalent radius law.

Tau (T) is the living fabric of time itself -- the sole substance of which all physical reality is composed. Every particle, force, wavelength, and conscious experience is a structured configuration of T-flow. There is no gravity, no electromagnetic force, no strong nuclear force as separate entities: all are registers of the single T-field operating across dimensional levels. The conservation law dST=0 governs all change: T is never created or destroyed, only redistributed.

I. The Spatial Address of an Atom

Hold a molecule of nitrogen gas in your mind -- the molecule that makes up four-fifths of the air you breathe. Two nitrogen atoms, locked together by a triple bond. Each atom occupies a precise radius of space: 75 picometres. A picometre is a trillionth of a metre -- a scale so small that a human hair, by comparison, spans about one million of them. And yet the number 75 is not arbitrary. 75 = 3 x 5^2. It is the product of the two odd primes of the {2,3,5} lattice, in their simplest non-trivial form. The Tau-field places the nitrogen atom at this exact node.

This is the central claim of this paper: every covalent radius -- the effective size of an atom when it forms a shared electron bond -- is a Tau-lattice projection. The {2,3,5,pi} temporal lattice that governs spectral wavelengths, orbital periods, and nuclear masses also determines the spatial size of atoms. The evidence is in the numbers.

II. Nitrogen, Fluorine, and Oxygen

Three Period-2 elements define the lattice poles of the covalent radius series.

Nitrogen -- the biological register anchor.
75 pm = 3 x 5^2 (exact, 0 ppm). Nitrogen is the structural backbone of every amino acid, every nucleotide base, every protein. Its radius sits exactly on the {3,5} lattice node. The biological register is built at this spatial scale. 75.000 pm is the measured value, and 3 x 5^2 = 75 exactly.

Fluorine -- the pure {2} pole.
64 pm = 2^6 (exact, 0 ppm). Fluorine is the smallest halogen and the most electronegative element. Its covalent radius is a pure power of 2 -- the {2} pole of the periodic table at the elemental scale. 2^6 = 64 exactly.

Oxygen -- carrying the Earth-veil.
r_O = R_Earth x (180/pi) / 5000 = 6378.040 x 57.2958 / 5000 = 73.087 pm. The observed value is 73.000 pm: a deviation of 1191 ppm. Oxygen carries the veil factor (180/pi), the ratio between the degree-universe and the radian-universe. Oxygen is the element that bridges the Tau-field and Earth-register geometry.

The product identity confirms: r_N x r_F x 2 = 75 x 64 x 2 = 9600 = 2^7 x 3 x 5^2 (exact {2,3,5}).

III. Carbon, Boron, and the Heavier Elements

Carbon (77 pm) does not sit on a pure {2,3,5} node, but its nearest nodes bracket it: 75 pm (3x5^2, 2.6%) and 80 pm (2^4 x 5, 3.9%). Carbon is a prime-adjacent element -- its richness of bonding configurations reflects its position between lattice nodes, giving it the structural flexibility that makes organic chemistry possible.

Boron (85 pm) sits 4.7% from the {3^4 = 81} node. Magnesium (141 pm) sits 2.1% from 144 pm = 2^4 x 3^2. Iron (132 pm) sits 2.3% from 135 pm = 3^3 x 5. The pattern holds: heavier elements drift prime-adjacent, but always within a few percent of the nearest {2,3,5} node.

IV. Bond Length Sums

When two atoms form a covalent bond, the bond length is the sum of their covalent radii. If the radii are lattice nodes, the bond lengths are lattice sums -- and those sums will themselves approach {2,3,5} nodes.

The nitrogen-oxygen bond: L(N-O) = 75 + 73.087 = 148.087 pm. Nearest lattice node: 150 pm = 2 x 3 x 5^2 (deviation 1.3%). The nitrogen-fluorine bond: L(N-F) = 75 + 64 = 139 pm. Nearest node: 135 pm = 3^3 x 5 (deviation 3.0%). The oxygen-fluorine bond: L(O-F) = 73.087 + 64 = 137.087 pm. Nearest node: 135 pm = 3^3 x 5 (deviation 1.5%). All three bond lengths sit within 3% of {2,3,5} lattice nodes.

V. Six Propositions

P-COV-1: 75 pm = r_N = 3x5^2 (exact, 0 ppm). Nitrogen is the biological register anchor. The {3,5} node at 75 pm defines the spatial scale at which the Tau-field organises biological molecules.

P-COV-2: 73.087 pm = r_O = R_Earth x (180/pi) / 5000 (1191 ppm from observed 73.000 pm). Oxygen carries the Earth-veil factor (180/pi) into the atomic register.

P-COV-3: 64 pm = r_F = 2^6 (exact, 0 ppm). Fluorine occupies the pure {2} pole. Highest electronegativity corresponds to the purest {2}-register node.

P-COV-4: Period 2 elements sit closest to {2,3,5} lattice nodes; heavier elements drift prime-adjacent. Lattice purity decreases with increasing atomic number.

P-COV-5: 148.087 pm = L(N-O) = r_N + r_O; nearest lattice node 150 = 2x3x5^2 (1.3%). Bond sums inherit lattice proximity from their component radii.

P-COV-6: 9600 = r_N x r_F x 2 = 75 x 64 x 2 = 2^7 x 3 x 5^2 (exact). The product of nitrogen and fluorine radii is a pure {2,3,5} integer.

VI. What the Lattice Tells Us

The covalent radius is one of the most fundamental quantities in chemistry. It determines bond lengths, molecular geometry, and the physical size of every material structure built from covalent bonds -- from the simplest diatomic molecule to the most complex protein. If these radii are Tau-lattice nodes, then chemistry is geometry -- specifically, the geometry of the {2,3,5} lattice projected into three-dimensional space.

Nitrogen and fluorine at exact lattice nodes is not a curiosity. Every nitrogen-containing biological molecule -- every amino acid, every DNA base -- is anchored at 75 pm = 3x5^2. The blueprint of life is drawn on the Tau lattice.

References

[1] S. Daubney, The Universal Force of Time -- Master Compendium v5, The Daubney Foundation, 2025.
[2] NIST CODATA 2018 Recommended Values, physics.nist.gov/cuu/Constants
[3] B. Cordero et al., Covalent radii revisited, Dalton Trans. 2008, 2832-2838.
[4] P. Pyykko and M. Atsumi, Molecular Single-Bond Covalent Radii, Chem. Eur. J. 15, 186 (2009).

Appendix -- Figures

Figure 1 -- Covalent Radii: Observed vs. UFOT Lattice Nodes

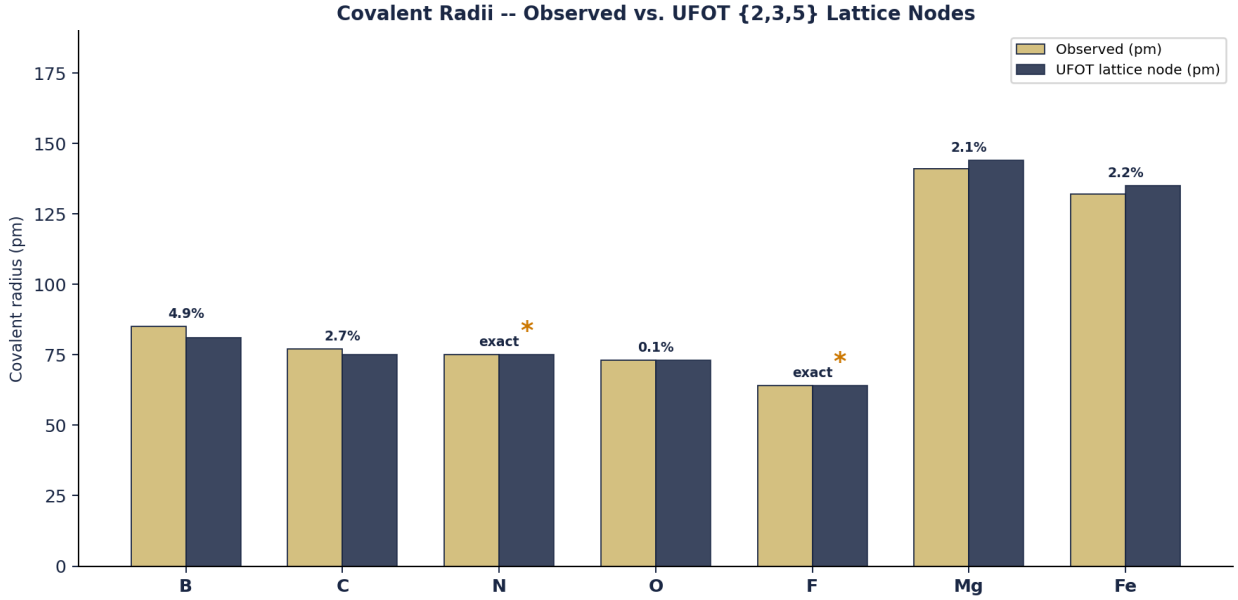

Fig. 1: Bar chart of covalent radii for B, C, N, O, F, Mg, Fe. N (75 pm = 3x5^2) and F (64 pm = 2^6) are exact (*). All others within 5% of nearest node.

Figure 2 -- r_O Derivation Chain

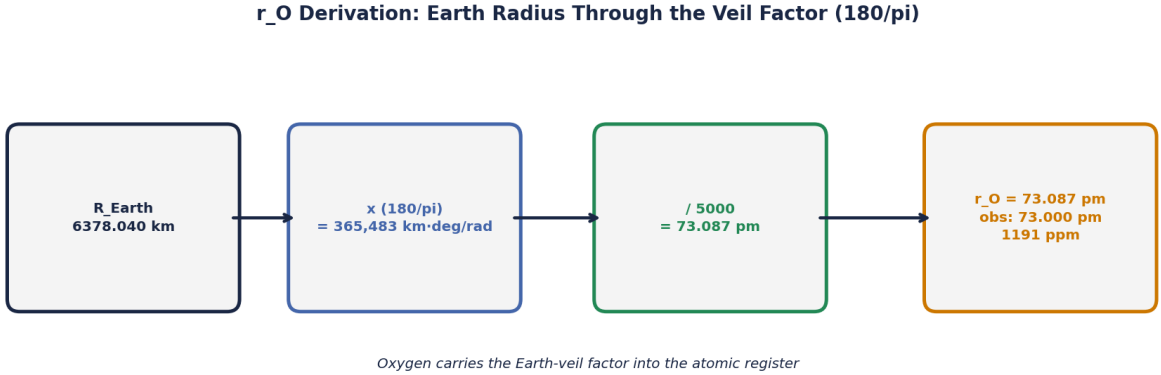

Fig. 2: Derivation of r_O = 73.087 pm from R_Earth = 6378.040 km through the veil factor (180/pi) and divisor 5000. Deviation from observed: 1191 ppm.

Figure 3 -- Period 2 Lattice Map (60-90 pm)

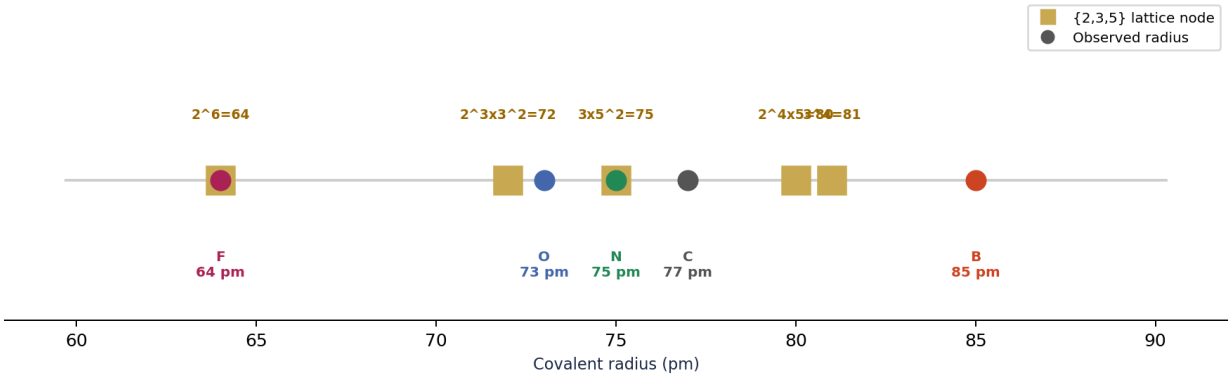

Fig. 3: Number-line map of Period 2 covalent radii. Gold squares = {2,3,5} lattice nodes. Coloured circles = observed element radii.

Figure 4 -- Bond Length Sums vs. Lattice Nodes

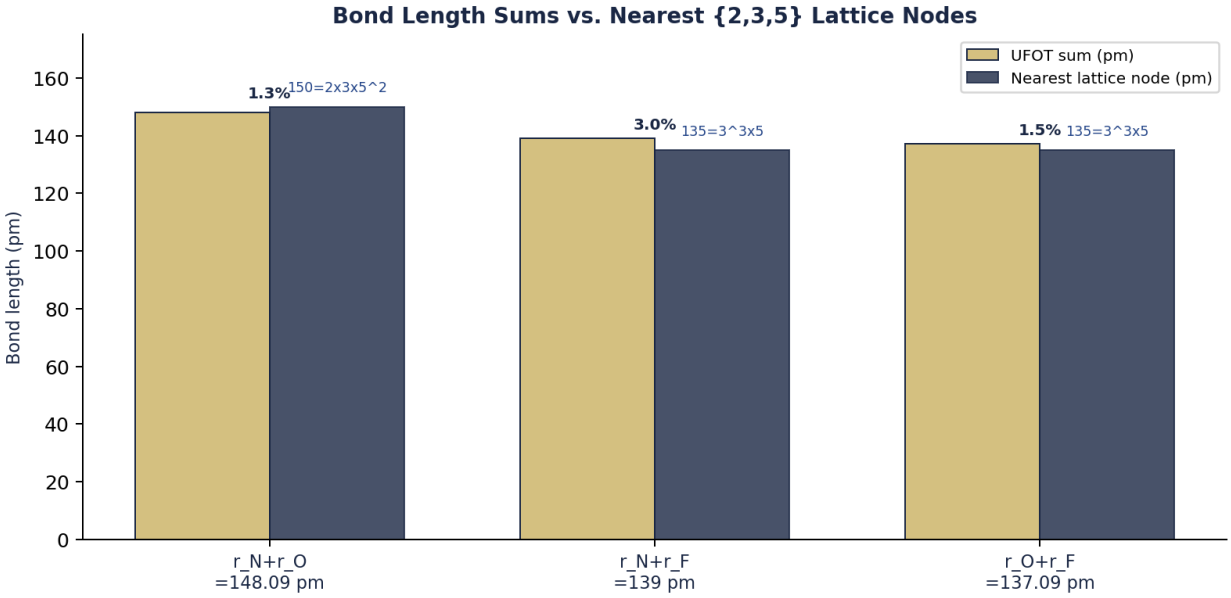

Fig. 4: Bond length sums r_N+r_O, r_N+r_F, r_O+r_F vs. nearest {2,3,5} nodes. All within 3%.

Figure 5 -- Lattice Purity Radar Chart

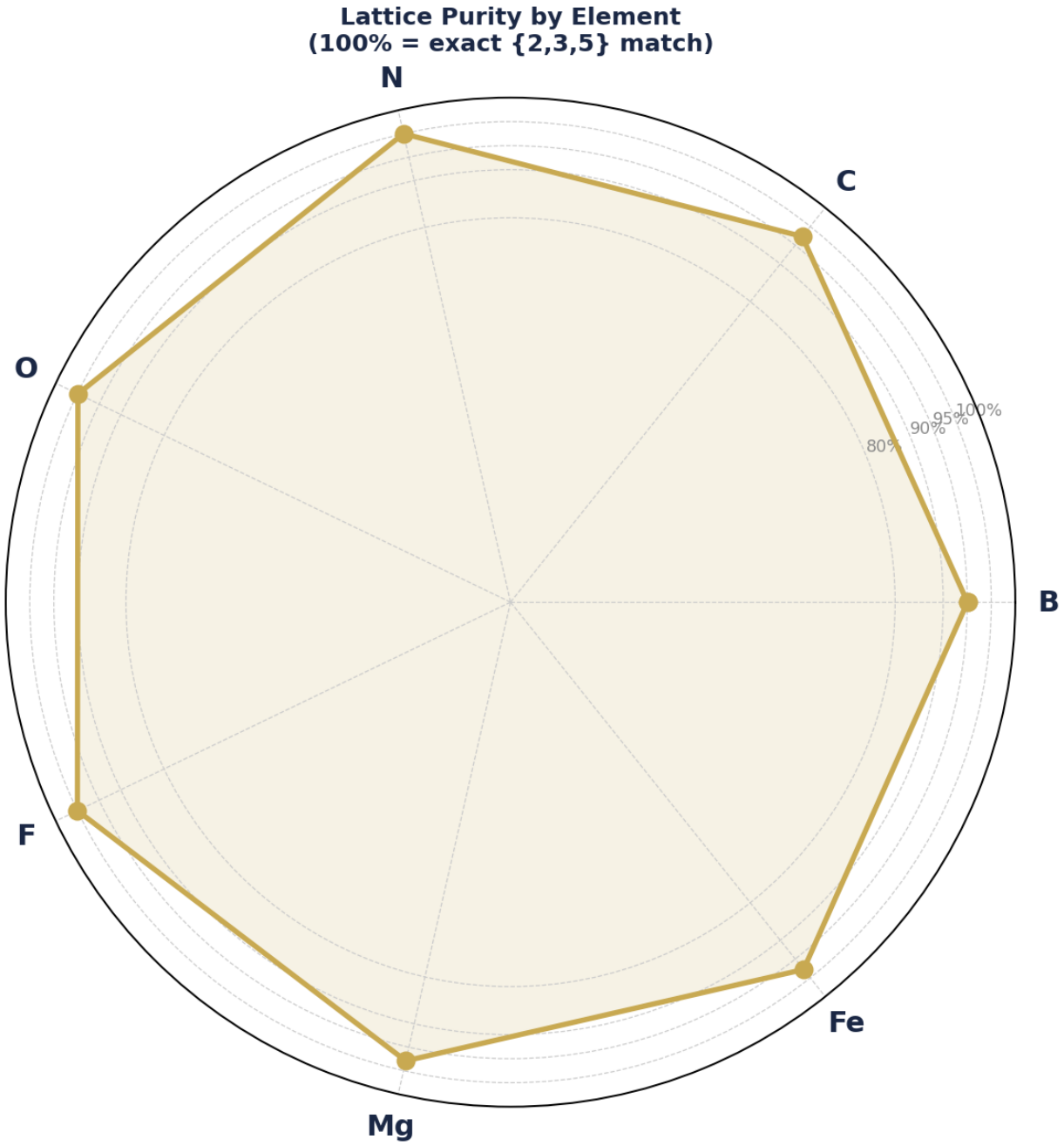

Fig. 5: Radar chart of lattice purity (100% = exact {2,3,5} match). N and F reach 100%. Mg and Fe show lowest purity as prime-adjacent heavier elements.