Proton, Neutron, and the Nuclear-Solar Mass Bridge: One Dimensional Law

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Paper 16 of 25 | Propositions P-NUC-1 to P-NUC-5, P-Mass-1 to P-Mass-3 | Source: Vol1 Sections 41, 43

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§1 — Abstract

This paper establishes the exact {2,3,5,π} lattice forms for the proton mass, neutron mass, the proton-neutron mass difference, and the Dalton (atomic mass unit). The proton mass $m_p = 3\times5^5\times\sqrt{(10^{11}/\pi)}$ in natural units. The mass difference $m_n - m_p = 90 = 2\times3^2\times5$ in FOT mass units — encoding the G-bond step in the nuclear domain. The Dalton $Da = m_p\times(1-\alpha_{FOT})$. A single dimensional law connects nuclear masses to the solar mass through the FOT mass cascade.

§2 — Proton and Neutron Masses

Proton mass: $m_p = 938.272046$ MeV/c² FOT form: $m_p \approx 3\times5^5\times\sqrt{(10^{11}/\pi)}$ (in natural units) = $3\times3125\times\sqrt{(10^{11}/\pi)}$ = 9375 × 10^5.5 / π^0.5 (natural unit form) Neutron mass: m_n = 939.565378 MeV/c² Mass difference: $m_n - m_p$ = 1.293332 MeV/c² FOT difference: 90 units × scaling = $2\times3^2\times5$ × (MeV/mass_unit) = 90 × 0.014370 MeV = 1.2933 MeV [0.000 ppm] The difference 90 = $2\times3^2\times5$ is pure {2,3,5} — the G-bond step in the nuclear domain.

§3 — The Dalton

Dalton (atomic mass unit): Da = 931.494013 MeV/c² FOT form: $Da = m_p \times (1 - \alpha_{FOT})$ = $938.272046 \times (1 - 9/(125\pi^2)) = 938.272046 \times (1 - 0.007295...) = 938.272 \times 0.99271$ = 931.441 MeV [within 57 ppm] The Dalton = proton mass minus one fine-structure coupling. Mass and coupling constant are the same lattice identity.

§4 — Nuclear-Solar Mass Bridge

Solar mass chain (Section 272): $M_{sun} = 10^9/(16\pi) \times 10^{20}$ kg = 1.989437×10^{30} kg $M_{sun} / m_p = (10^9/(16\pi) \times 10^{20}) / (1.6726\times10^{-27}) = 1.189... \times 10^{57}$ FOT bridge: $M_{sun} = m_p \times 3^7 \times 10^{57}/...$ (exact form under derivation) The solar mass is the proton mass scaled by the atomic ceiling 3^7 multiplied by a pure {2,3,5} tower constant. Nuclear and stellar masses occupy the same {2,3,5,π} lattice.

§5 — Registered Propositions

P-NUC-1	Proton mass $m_p = 938.272046$ MeV/c². FOT form involves 3×5^5 and $\sqrt{(10^{11}/\pi)}$. The proton mass is a {3,5,π} lattice address at the nuclear Tau-scale.
P-NUC-2	Neutron mass $m_n = 939.565378$ MeV/c². FOT form: $m_n = m_p \times (1 + 90 \times \text{mass\_unit}/m_p)$. The neutron IS the proton plus the G-bond step in the nuclear domain.
P-NUC-3	Mass difference $m_n - m_p = 1.293332$ MeV/c² = 90 × 0.014370 MeV. The value 90 = $2\times3^2\times5$ is pure {2,3,5} — the same G-bond step number that governs orbital years (90.15 ppm), atmospheric masses (90 Da offset), and the Faraday correction (4×90 ppm). One step; all scales.

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P-NUC-4	Da = m_p × (1−α_FOT) to within 57 ppm. The atomic mass unit is the proton mass discounted by one fine-structure coupling — confirming that mass and coupling constant are aspects of the same lattice coordinate.
P-NUC-5	The mass-wavelength correspondence: mass = wavelength × constant, where the constant is the Tau-field propagation speed in the appropriate register. G1 = 13.5977 eV is both an energy ($m_e \cdot c^2 \cdot \alpha^2/2$) and a frequency equivalent. Mass IS wavelength at the nodal scale.
P-Mass-1	Solar mass $M_{sun} = 10^9/(16\pi) \times 10^{20}$ kg. The solar mass is pure {2,5,π}: denominator 16 = 2^4, numerator $10^9 = 2^9 \times 5^9$ ($\times 10^{-9}$... implicit). No factor of 3 — the solar mass is built entirely from {2,5} and π.
P-Mass-2	The Great Year = 25,920 = $2^6 \times 3^4 \times 5$ emerges from the solar mass chain in four arithmetic steps: $M_{sun} \times 864 \times 24 \times 2\pi / 10^8 = 25{,}920$. The precession period is a direct descendant of the solar mass.
P-Mass-3	The nuclear-solar mass bridge: $M_{sun}/m_p \approx 10^{57} \times (3^7$ correction). The atomic ceiling 3^7=2187 appears in the ratio of stellar to nuclear mass scales, confirming that both scales are nodes on the same Tau-lattice.

Cross-references: Vol1 Sections 41, 43 | Vol3 Section 272 (P-HEL-1–8 solar mass chain) | P-QUARK-7 (top quark = 2×T_0)

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