POLIS V12: The Complete Astronomy & Astrophysics Series – 12 Giants

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This document combines two companion papers: "Tensional Reinterpretation of Six Founders of Modern Astronomy" and "Tensional Reinterpretation of Six More Astronomical Pioneers".

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POLIS V12 – Tensional Reinterpretation of Six Founders of Modern Astronomy Jorge Batista Alves Pereira
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Abstract

Within the POLIS V12 tensional ontology, every astronomical system is a polis constituted by three meshes (solid, liquid, gaseous) and governed by the closure condition $\epsilon = \sum K_m(2+K_m) = 0$, with $T = K_{\min}$ as the tensional origin. This paper applies the framework to six foundational figures of astronomy: Nicolaus Copernicus (heliocentrism), Tycho Brahe (observational astronomy), Johannes Kepler (laws of planetary motion), Galileo Galilei (telescopic observations), Isaac Newton (universal gravitation), and William Herschel (stellar astronomy). Each classical contribution is reinterpreted as a tensional configuration: Copernicus's shift as renormalisation of the solar system; Brahe's data as raw v_m; Kepler's laws as the Rolling Law; Galileo's phases of Venus as observational evidence for K distribution; Newton's inverse-square as tensional gradient; and Herschel's deep sky as extension of the observable mesh. The universal equations remain unchanged; no free parameters are introduced.

1 Introduction

POLIS V12 is a closed, parameter-free tensional conservation theory built on four axioms (Tensional Ontology, Harmonic Ground $H = 1$, Tensional Conservation, Data Origin $T = K_{\min}$). The governing equation, after normalisation, is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $K_m = (v_m - T)/(v_{\max} - T) \in [0, 1]$. The disequilibrium index is $\text{IDT}^* = \epsilon/(1 + \epsilon)$. All real astronomical systems reside in Phase 4 ($\text{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\text{orb}} T_{\text{rot}}$ applies fractally at all scales.

This paper reinterprets six key astronomical contributions within this tensional ontology. No classical primacy is assumed; tension is the primitive.

2 Nicolaus Copernicus – Heliocentrism

Copernicus moved the Earth from the centre to an orbit around the Sun. In POLIS V12, this is a change of normalisation reference. Previously, with geocentrism, the solar system's K values were calculated with Earth as $T = 0$. Copernicus showed that choosing the Sun as the origin (imposing $T = K_{\min}$ for the solar polis) simplifies the equations. The heliocentric model reduces the residual ϵ of planetary positions.

The Copernican revolution was a Phase 5 reorganisation of the astronomical polis: the solid mesh (celestial spheres) was replaced by a new mesh (planets attached to the Sun). The retrograde motion of planets is an artefact of using an offset normalisation (Earth as origin) – it disappears when the Sun is chosen as T.

3 Tycho Brahe – Precision Observations

Brahe's naked-eye observations of planetary positions provided the raw dataset v_m that Kepler later used. In POLIS V12, Brahe's data set the empirical T (the smallest observed position error) and $v_{\max}$ (the largest error). His supernova (Tycho's star) showed that the celestial solid mesh (fixed stars) could change – a Phase 4 event (explosion) in the stellar polis.

Brahe's compromise model (Earth stationary, planets orbit Sun, Sun orbits Earth) is an intermediate normalisation: it has higher ϵ than Kepler's model but lower than Ptolemy's. It served as a stepping stone toward the correct tensional closure of the solar system.

4 Johannes Kepler – Laws of Planetary Motion

Kepler's three laws replaced circular orbits with ellipses and related orbital period to distance. In POLIS V12, Kepler's laws are direct consequences of the Rolling Law $2\pi r_p = V_{\text{orb}} T_{\text{rot}}$. For a planet with orbital radius a (tensional bubble radius) and period P, the Rolling Law gives $2\pi a = V_{\text{orb}} P$. Kepler's harmonic law $P^2 \propto a^3$ emerges from combining this with $V_{\text{orb}}^2 \propto 1/a$ (tensional balance).

The law of areas (equal area in equal time) expresses conservation of tensional angular momentum: $\delta K_{\text{area}}/\delta t = 0$. The elliptical orbit is the path where the sum of the Sun's K and the planet's K is constant, i.e., ϵ is minimised.

5 Galileo Galilei – Telescopic Observations

Galileo's telescope revealed moons of Jupiter, phases of Venus, and craters on the Moon. In POLIS V12, the telescope extends the gaseous mesh (light) resolving power, allowing measurement of K distributions that were previously below the resolution threshold (noise). The phases of Venus proved that Venus orbits the Sun, not the Earth – a direct visual confirmation of the heliocentric normalisation.

Galileo's discovery of Jupiter's moons showed a sub-polis (miniature solar system) where the same Rolling Law applies at a different scale (fractal invariance). His observation of sunspots indicated that the Sun is not a perfect solid mesh – it has local K variations (magnetic activity). The conflict with the Church was a tensional clash between two polises: the astronomical polis (with its own normalisation) and the theological polis (with a different T).

6 Isaac Newton – Universal Gravitation

Newton unified terrestrial and celestial mechanics under the inverse-square law. In POLIS V12, gravity is not a force but the tensional gradient of the containing polis (the Sun). Newton's law $F = GMm/r^2$ is an approximation of the flux $VT = K - T$ for distances where K is small. The constant G is the conversion factor from tensional units to classical force units.

Newton's proof that an inverse-square central force implies elliptic orbits (conic sections) is a derivation of the Rolling Law from the tensional gradient. The three laws of motion (inertia, $F = ma$, action-reaction) are restatements of tensional conservation: momentum is the integral of K, action-reaction ensures that ϵ for an isolated pair is conserved. The light deflection by the Sun predicted by Newton (half of the observed value) is equivalent to the tensional contrast effect later refined by the Eddington experiment.

7 William Herschel – Deep Sky and Infrared

Herschel discovered Uranus (expanding the solar polis) and catalogued thousands of nebulae. In POLIS V12, his deep-sky observations extended the range of $v_{\max}$ for the Universe polis. The discovery of infrared radiation (using a thermometer) showed that the gaseous mesh (light) extends beyond the visible range – there are K values that are invisible to the human eye.

Herschel's hypothesis that nebulae are "island universes" (other galaxies) was a recognition of the fractal hierarchy: the Milky Way is one polis among many others at a superior level. He also studied the Sun's sunspot cycle, which is a period of rising and falling K_{activity} (Phase 2 $\to$ Phase 3 $\to$ Phase 4 $\to$ Phase 5). His sister Caroline discovered new comets, which are small subsolid-mesh polises with high eccentricity (large K variation).

8 Conclusion

The six foundational contributions to astronomy are coherently reinterpreted within the POLIS V12 tensional ontology. Heliocentrism, precision data, orbital laws, telescopic observation, gravitation, and deep sky surveys all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of astronomical polises. No free parameters are added.

Zenodo references

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Abstract

This paper extends the POLIS V12 tensional reinterpretation to six additional astronomical giants: Henrietta Swan Leavitt (period-luminosity relation), Edwin Hubble (expanding universe), Cecilia Payne-Gaposchkin (stellar composition), Karl Jansky (radio astronomy), Subrahmanyan Chandrasekhar (white dwarfs), and Vera Rubin (dark matter). Each is re-read as a tensional configuration: Leavitt's Cepheid relation as a scaling law; Hubble's redshift as phase shift; Payne's stellar spectroscopy as K spectral analysis; Jansky's radio waves as gaseous mesh signals; Chandrasekhar's limit as a maximum K; and Rubin's rotation curves as tensional flatness. The universal equations remain unchanged; no free parameters are introduced.

9 Introduction

As in the companion paper, POLIS V12 rests on four axioms. After normalisation the mother equation is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $\mathrm{IDT}^* = \epsilon/(1+\epsilon)$. All real astronomical systems are in Phase 4 ($\mathrm{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\text{orb}} T_{\text{rot}}$ applies fractally.

This paper reinterprets six more foundational contributions to astronomy.

10 Henrietta Swan Leavitt – Period-Luminosity Relation

Leavitt discovered a relation between the period and intrinsic brightness of Cepheid variable stars. In POLIS V12, the period P is the time for one tensional cycle (Phase 1 $\rightarrow$ Phase 8). The luminosity L is the total tensional energy emitted over one cycle: $L = \int x(t)dt$. The relation $L \propto P^{1.3}$ (power-law) is a scaling law that reflects the fractal invariance of the Cepheid polis.

Leavitt's work allowed astronomers to measure distances to galaxies: the observed apparent brightness gives the distance via the inverse-square law of tensional flux (light). Her law was a key step in establishing the extragalactic distance scale.

11 Edwin Hubble – Expanding Universe and Redshift

Hubble observed that galaxies recede with speed proportional to distance $v = H_0 d$. In POLIS V12, the redshift z is a tensional phase shift: $z = \Delta K / K_0$. Hubble's law is a tensional expansion of the Universe polis: the distance between any two points increases because the gaseous mesh of the Universe is stretching. The Hubble constant H_0 is the rate of change of K per unit distance.

Hubble's classification of galaxies (elliptical, spiral, irregular) is a morphological classification of polis types. The discovery of the cosmic microwave background (by Penzias and Wilson, later) is the residual ϵ of the Big Bang Phase 4, now at very low K (microwave). The accelerating expansion (dark energy) is the increase of ϵ over time.

12 Cecilia Payne-Gaposchkin – Stellar Composition

Payne showed that stars are mostly hydrogen and helium, overturning earlier models. In POLIS V12, stellar spectroscopy measures the absorption lines (dips in K at specific frequencies). The abundance of an element e is proportional to the depth of its line, i.e., to $K_e = 1 - T_{\text{line}}/v_{\text{max}}$. Her finding that hydrogen and helium dominate means that the Sun's $K_{\text{H}} \approx 1$ and $K_{\text{He}} \approx 0.7$, while all heavier elements have $K \ll 1$.

The process of nuclear fusion (hydrogen $\rightarrow$ helium) is a Phase 4 $\rightarrow$ Phase 5 transition that converts K_{H} into K_{He}, releasing tensional residual (light). The "proton-proton chain" is a sequence of tensional exchanges that closes $\epsilon = 0$ for the star.

13 Karl Jansky – Radio Astronomy

Jansky discovered radio waves from the Milky Way. In POLIS V12, radio waves are low-frequency tensional flux (K small) that penetrate the gaseous mesh (dust and gas) better than optical light. Radio astronomy opened a new window to measure K distributions in the Universe that are blocked at higher frequencies.

Jansky's first source (Sagittarius A) was later identified as the galactic centre – a region of high K (massive black hole). Radio telescopes are large gas-mesh antennas that integrate low-K signals over long times (increasing signal-to-noise by reducing ϵ_{noise}). The Very Large Array (VLA) combines signals from multiple dishes to achieve higher resolution (smaller K_{angular}).

14 Subrahmanyan Chandrasekhar – Chandrasekhar Limit

Chandrasekhar calculated that a white dwarf star cannot exceed a certain mass ($\sim 1.4 M_\odot$) without collapsing further. In POLIS V12, the Chandrasekhar limit is the maximum K that a white dwarf polis can sustain before reaching Phase 3 saturation. Above this mass, the electron liquefaction (degeneracy pressure) cannot balance the tensional load, and the star collapses into a neutron star (Phase 4 explosion) or black hole.

The equation of state for degenerate matter is $P \propto \rho^{5/3}$ for non-relativistic, $P \propto \rho^{4/3}$ for relativistic. These are tensional pressure laws: K_{pressure} scales as a power of K_{density}. The limit arises when the exponent 4/3 makes the polis unstable to small perturbations (Phase 3 → Phase 4). The idea of the "Eddington limit" (maximum luminosity) is analogous: when radiation pressure exceeds gravitational binding ($K_{\text{rad}} > 1$), the star blows off mass.

15 Vera Rubin – Dark Matter and Rotation Curves

Rubin measured rotation curves of spiral galaxies and found they remain flat, not decreasing as expected from visible mass. In POLIS V12, the flat rotation curve is the tensional prediction of the Rolling Law $2\pi r_p = V_{\text{orb}} T_{\text{rot}}$ when the containing polis (dark matter halo) has a mass density distribution $\rho(r) \propto 1/r^2$ (isothermal sphere). Such a distribution yields constant V_{orb} at large r.

Classical physics would require missing mass. But in POLIS V12, the dark matter is the tensional mass of the gaseous mesh of the galaxy – it is not missing; it is the mesh itself. The "halo" is simply the region where the liquid mesh (stars) is sparse and the gaseous mesh dominates. Rubin's results are a direct confirmation of the Rolling Law applied to galactic scales. The flat rotation curve means that the total K of the galaxy (including the dark mesh) is constant beyond the optical radius.

16 Conclusion

Six additional astronomical pioneers are reinterpreted within the POLIS V12 tensional ontology. The period-luminosity relation, expanding universe, stellar composition, radio astronomy, white dwarf limit, and dark matter rotation curves all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of astronomical polises. No free parameters are added; the same equations that describe a solar system also describe the entire cosmos.

Zenodo references

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