Pressure Based Theory: Testable Hypotheses and Distinctions from General Relativity and Quantum Field Theory

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CORRECTED VERSION — 2026-07-21

This is a **corrected version** of the paper originally submitted August 2025 to OSF (DOI: 10.17605/OSF.IO/ZUGT4) and ai.viXra.org (submission 2508.0022v1). A systematic audit conducted 2026-07-21 found several calculation and citation errors in the original text (Wayback Machine archaeology confirmed these were original mid-2025 drafting mistakes, not artifacts of a later site migration). Every correction is marked inline, dated, and explains what the original said, what was found, and why. The externally registered OSF and ai.viXra.org submissions reflect the original, uncorrected text and have not themselves been revised — this corrected version is hosted only at solvetheuniverse.com.

Correction credits: errors were identified and calculations independently redone by Claude (Anthropic). Several of the most significant findings — the CHSH ~2.82 entanglement claim, the Fermilab muon g-2 anomaly figure, the "Belle II" citation, and the neutron decay lifetime calculation — were additionally cross-checked and confirmed independently by Grok (xAI). Original authorship and drafting: Matthew Foutch, with Grok (xAI) as collaborative AI, per the original acknowledgment below.

Pressure Based Theory: Testable Hypotheses and Distinctions from General Relativity and Quantum Field Theory — the formally published, citable synthesis of PBT, registered on two independent platforms, tracked under Matthew's ORCID iD.

- **OSF Preprints** (Center for Open Science) — the version with a real, Crossref-registered DOI: doi.org/10.17605/OSF.IO/ZUGT4. HTML page.
- **ai.viXra.org** — submission `2508.0022v1`, August 2025: abstract page · download the PDF.
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This is the one piece of PBT with permanent external identifiers, independently citable and separate from anything hosted on this site.

Corrigendum, 2026-07-21: this paper's drag-threshold figure ($< 10^{-19}$ m/s², repeated below) was found to be a real error during a systematic audit of all 13 site papers — recomputing the same formula and inputs actually gives $\approx 9.8 \times 10^{-16}$ m/s² (still below the stated detection threshold, so the qualitative conclusion is unaffected, but the specific number was wrong). This corrigendum is noted here on the hosted site page; the versions registered with OSF (DOI) and ai.viXra.org are formally submitted external records and have not been revised on those platforms — that would need a separate, deliberate errata/versioning step on each platform, not made here without explicit direction. Correction identified and calculated by Claude (Anthropic). Original authorship and drafting: Matthew Foutch, with Grok (xAI) as collaborative AI.

Abstract

Pressure Based Theory (PBT) proposes a mechanical unification of fundamental forces through particle fluxes in an infinite pressure vessel, extending historical push gravity models like Le Sage's theory. This paper formalizes PBT's key testable hypotheses: negligible gravitational drag ($\approx 9.8 \times 10^{-16}$ m/s², corrected 2026-07-21 from an original $< 10^{-19}$ m/s²) and avoidance of singularities in black hole collapse. These predictions differ from general relativity (GR), which allows singularities, and quantum field theory (QFT), which incorporates probabilistic interactions without mechanical pushes. We detail experimental setups for falsification, including precision interferometry for drag and horizon imaging for singularities, positioning PBT as a falsifiable alternative to standard models.

Two Core Testable Hypotheses

Negligible Drag Hypothesis. Gravitational or aether drag $\approx 9.8 \times 10^{-16}$ m/s² (corrected 2026-07-21 from an original $< 10^{-19}$ m/s²), below current detection thresholds but testable at higher precision. This contrasts GR's zero drag (pure geometry) and QFT's vacuum fluctuations

without bulk drag. Exceeding this (e.g., 10^{-14} m/s², adjusted from the original 10^{-18} m/s² for consistency with the corrected threshold) would falsify PBT. Test method: atomic clocks or interferometers (e.g., LISA Pathfinder successors) for orbital anomalies; space-based missions measuring drag in solar system orbits, compared to GR baselines.

Singularity Avoidance Hypothesis. Black hole collapse stabilizes without horizons or true singularities, forming dense cores with finite density — differing from GR's inevitable singularities (Penrose-Hawking theorems) and QFT's unresolved quantum singularities. Observing true horizons or information loss would falsify PBT. Test method: Event Horizon Telescope (EHT) imaging of shadows; deviations in ringdown phases from LIGO waves indicating non-singular cores; analysis of mergers for stable remnants.

Light deflection is predicted as $\theta \approx 4GM/(bc^2)$, aligning with GR in weak fields but diverging in strong regimes.

Differences from GR and QFT

Vs. GR: PBT uses pushes over curvature; predicts no singularities but similar weak-field effects (e.g., light deflection 1.75″). Differs in strong fields: stable black holes vs. GR's collapse.

Vs. QFT: Mechanical determinism over probabilistic exchanges; no photons, virtual particles as flux distortions. Predicts EM unification without renormalization issues. PBT resolves dark matter via hierarchies, unlike GR+QFT's need for it.

Conclusion

PBT's hypotheses offer a pathway for unification, testable via drag measurements and singularity probes. This published version includes the full Reference Guide as an appendix, summarizing all 12 papers with key equations and links.

Assistance from Grok (xAI) in drafting and refining this work is gratefully acknowledged.

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Introduction

Pressure-Based Theory (PBT) models the universe as an infinite pressure vessel with hierarchical particle fluxes, where forces emerge from push effects due to shadowing and aether distortions. Evolving from Infinite Push-Pressure Theory to Hybrid Push-Aether Theory, it unifies forces mechanically, addressing anomalies in GR and QFT without dark matter or singularities. This guide summarizes the 12 foundational papers, with overviews, key equations, and links.

For details, visit PBT Papers page. This guide is also included as an appendix in the formally published version of PBT on ai.viXra.org, and a PDF version with the original flux-shadowing figure is available in the PDF Library.

Corrigendum, 2026-07-21: a systematic audit found several of the specific claims summarized below to be errors in the original papers (confirmed via Wayback Machine archaeology to be original mid-2025 drafting mistakes, not a migration artifact) — muon g-2 anomaly stated ~10x too small, CHSH ~2.82 unsupported by the stated mechanism, neutron decay lifetime miscalculated, H_0 *imprecisely described as matching Planck. Each has been corrected with a dated revision note directly in its source paper; the individual summaries below are annotated with pointers to those corrections. This PDF version and the ai.viXra.org/OSF submission linked above predate these corrections and have not themselves been revised — see Published Paper for that status. Corrections identified and calculated by Claude (Anthropic); the g-2, CHSH, Belle II, and neutron-decay findings were additionally verified independently by Grok (xAI). Original authorship and drafting: Matthew Foutch, with Grok (xAI) as collaborative AI.*

Generated via Python/matplotlib from simplified shadowing equation $F \propto A\,\Delta P$.

Figure 1 illustrates the core concept of flux shadowing in PBT at various scales. The arrows represent directional particle fluxes in the infinite pressure vessel, converging radially to simulate attractive forces like gravity. Solid arrows indicate primary flux directions, while dotted patterns (if present in visualizations) could denote secondary distortions or aether flows. Units of scale are conceptual: at subatomic levels (e.g., 10^{-15} m), fluxes model nuclear forces; at planetary scales (e.g., 10^{6} m), they replicate Newtonian gravity; and at galactic scales (e.g., 10^{21} m), they explain flat rotation curves without dark matter. This multi-scale depiction highlights PBT's hierarchical unification.

Paper Summaries

Detailed summaries of each paper follow.

PBT Paper 01: Infinite Push-Pressure Theory

Introduces PBT as hierarchical mechanical unification, resolving anomalies like flat rotation curves without dark matter via infinite pressure vessel and shadowing fluxes.

- **Key Equation:** $G_{eff}(l) \approx \varepsilon(l)\,\sigma(l)^2/(4\pi\, m(l)^2)$, with $\varepsilon(l) = \varepsilon_0 (l_0/l)^\gamma$.
- **Significance:** Matches $G \approx 6.6743 \times 10^{-11}$ m³ kg⁻¹ s⁻²; nuclear bindings ~8 MeV/nucleon; $v(r)$ flattens to ~220 km/s.

Full Paper

PBT Paper 2: Hybrid Push-Aether Theory (Relativistic Unification)

Extends with dynamical aether for Lorentz invariance, unifying relativistically.

- **Key Equation:** $\theta \approx (4GM)/(c^2 b) \approx 1.75''$ for Sun.
- **Significance:** Matches GR weak fields; predicts frame effects $< 10^{-6}$ testable at LIGO.

Full Paper

PBT Paper 3: Hybrid Push-Aether Theory (Electromagnetic Forces)

Models magnetism and EM as subatomic flux gradients and directional flows within hierarchical levels.

- **Key Equation:** $B(r) \approx \mu_0(\text{flux gradient} \times \sigma_{charge})$, with flux gradient $\propto \varepsilon(l)\,\nabla(q/r)$; Lorentz force $F = q(v \times B) \approx q\, v \times (\text{particle flow direction})$.
- **Significance:** Derives EM without virtual photons; predicts flow anisotropies in superconductors testable via muon spin rotation; deviations from QED in high fields.

Full Paper

PBT Paper 4: Hybrid Push-Aether Theory (Addressing Objections)

Addresses falsifiability via simulations; focuses on relativity conflicts (updated from nuclear forces).

- **Key Equation:** $v(r) = \sqrt{G_{eff}(r)\, M_{enc}(r)/r}$, $G_{eff}(r) = G[1 + k(r/r_0)^\gamma]$.

- **Significance:** Aligns with data; strengthens unification.

Full Paper

PBT Paper 5: Hybrid Push-Aether Theory (Quantum Spin, Entanglement, and Higher-Spin Integration, Revised)

Derives quantum spin, full entanglement, and higher-spin mechanics as emergent vorticity and correlated disturbances in the aether — extends the original quantum-mechanics derivation with refined aether couplings and QFT-style renormalization for infinite scales.

- **Key Equation:** $\omega = \nabla \times v$ (spin as quantized vorticity); CHSH ~2.82 from correlated flux. *(Corrected 2026-07-21: this reconstructs to CHSH = 1.999, the classical bound — see Paper 5.)*
- **Significance:** Quantizes mechanically; explains entanglement with ~99.5% correlation; resolves Rarita-Schwinger ghosts via aether suppression.

Full Paper

PBT Paper 6: Hybrid Push-Aether Theory (Quantum Spin Precession)

Models quantum spin precession from aether vorticity, with damping for stability.

- **Key Equation:** $dS/dt = -(g\mu_B/\hbar)\, S \times B$; aether damping $\xi\, u^\mu S_\mu = 0$, $\xi = 10^{-15}$.
- **Significance:** Derives spin mechanically; predicts precession frequency $\omega = g\mu_B B/\hbar \approx 1.76 \times 10^{11}$ rad/s for $B = 1$ T; decoherence anomalies testable via Bell experiments.

Full Paper

PBT Paper 7: Grand Unification

Unifies forces mechanically with infinite hierarchies.

- **Key Equation:** $\varepsilon(l) = \varepsilon_0 (l_0/l)^\gamma$; $H^2 = 8\pi G \rho_{eff}/3$.
- **Significance:** 80% alignment; proton decay $> 10^{34}$ years. *(Note, 2026-07-21: "80% alignment" isn't a computed statistic, and this paper's own g-2/CHSH/neutron-decay alignments are corrected above — see Paper 7.)*

Full Paper

PBT Paper 8: Hybrid Push-Aether Theory (Full QFT Action)

Develops QFT action for hierarchical unification, quantizing pushes and aether.

- **Key Equation:**
$$S = \int \sqrt{-g} \left[\frac{R}{16\pi G} - K \nabla u \nabla u + \lambda (u \cdot u + 1) + \frac{1}{2} \partial_\mu \phi \, \partial^\mu \phi - \frac{m^2 \phi^2}{2} - \frac{\lambda \phi^4}{4} + \bar{\psi} (i \gamma^\mu D_\mu - m$$
- **Significance:** Closes multi-field QFT gaps; predicts muon $g\text{-}2$ anomaly $\delta g \sim 10^{-10}$, matching Fermilab data; couplings unify at 10^{16} GeV. *(Corrected 2026-07-21: the real anomaly is $\approx 2.51 \times 10^{-9}$, ~10x larger — see Paper 8.)*

Full Paper

PBT Paper 9: Hybrid Push-Aether Theory (Higher-Spin Framework and Infinite-Scale Cosmology)

Integrates higher-spin framework as multi-twist vorticities using Vasiliev-Fronsdal formalism and infinite-scale cosmology as pressure-driven expansion for grand unification.

- **Key Equation:** Friedmann equation $H^2 = (8\pi G/3)\rho_{eff} + (\Lambda c^2/3)$, with $\rho_{eff} = \varepsilon(l \to \infty)/c^2 \sim 10^{-26}$ kg/m³; higher-spin $\nabla^\mu \Phi_{\mu\ldots} = 0 + \xi u^\mu \Phi_{\mu\ldots} = 0$ (ghost-free).
- **Significance:** Aligns with LIGO GW speed $v_g = c \pm 10^{-15}$; predicts GW variations $\sim 10^{-16}$ testable by LISA; $H_0 \sim 70$ km/s/Mpc matching Planck; closes 6% gaps in higher-spin and cosmology for unification with Papers 8 and 10; no singularities due to infinite scales. *(Corrected 2026-07-21: 70 km/s/Mpc is 3.86% off Planck and 4.11% off the local/SH0ES value — it doesn't distinctly match either; see Paper 9.)*

Full Paper

PBT Paper 10: Hybrid Push-Aether Theory (Weak/Strong Forces)

Models weak as leaks, strong as vorticity (updated from astrophysics).

- **Key Equation:** $\Gamma_{weak} \approx G_F^2 m^5/(192\pi^3)$.
- **Significance:** Neutron lifetime ~880 s; confinement ~10^{-15} m. *(Corrected 2026-07-21: the paper's own formula and inputs actually give a lifetime of $\approx 3.95 \times 10^{-11}$ s, not 880 s — the most severe error found in the audit; see Paper 10.)*

Full Paper

PBT Paper 11: Hybrid Push-Aether Theory (Empirical Tests)

Synthesizes alignments for unification (updated from quantum gravity).

- **Key Equation:** $m_\nu \approx 10^{-3}$ eV.
- **Significance:** Aligns with proton decay, neutrino data.

Full Paper

PBT Paper 12: Top Five Equations

Highlights successes over historical models.

- **Key Equation:** $g \approx 2$ from vorticity; CHSH ~2.82. *(Corrected 2026-07-21: CHSH reconstructs to 1.999, the classical bound, not 2.82 — see Paper 5; the "Belle II ~2.78±0.05" citation elsewhere in this paper also appears unsupported — see Paper 12.)*
- **Significance:** Matches g-2 anomaly $< 10^{-12}$; entanglement without non-locality. *(Corrected 2026-07-21: the real Fermilab anomaly is $\approx 2.51 \times 10^{-9}$ — see Paper 7.)*

Full Paper

Conclusion

This reference enables independent PBT study. For collaboration, contact mwfoutch@gmail.com. Assistance from Grok (xAI) acknowledged.

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