One Postulate, 38 Equations: Unification of Physics from the Wavelength-Stretch Dynamics of Light

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July 29, 2026

Abstract

This paper presents a unified theoretical framework based on a single postulate: *a continuous segment of light propagates continuously at a constant speed in absolute space.* From this postulate, three physical meanings emerge—constancy of light speed, continuity of propagation, and an upper bound on wavelength-stretch acceleration numerically equal to c. From radiation pressure experiments, we derive the core dynamic equation, the redshift formula, and the scaling law $\bar{g}D = c^2$, which is shown to be the direct product of the three postulates themselves. From these, a unified mother equation is constructed:

$$h\nu_0 = h\nu_0 e^{-gD/c^2} + \sqrt{p^2c^2 + m^2c^4}.$$

This mother equation, together with the acceleration/deceleration equations of matter–light transformation, reduces in appropriate limits to **38 core equations of physics**, covering classical mechanics, electrodynamics, thermodynamics, statistical mechanics, fluid dynamics, special relativity, general relativity, quantum mechanics, quantum field theory, gauge theory, condensed matter physics, black hole physics, quantum gravity, cosmology, and nonlinear dynamics. The theory predicts a cosmic critical acceleration $1.02 \times 10^{-10}\,\mathrm{m/s^2}$, matching the dark matter threshold, and a QCD string tension $0.936\,\mathrm{GeV/fm}$, matching the experimental value. All 38 equations are **derived**, not assembled, from the same foundational postulate.

Résumé

Cet article présente un cadre théorique unifié basé sur un seul postulat : *un segment continu de lumière se propage de manière continue à vitesse constante dans l'espace absolu.* De ce postulat émergent trois significations physiques—la constance de la vitesse de la lumière, la continuité de la propagation, et une limite supérieure de l'accélération d'étirement de longueur d'onde numériquement égale à c. À partir d'expériences de pression de radiation, nous dérivons l'équation dynamique centrale, la formule du décalage vers le rouge, et la loi d'échelle $\bar{g}D = c^2$, qui est le produit direct des trois postulats eux-mêmes. À partir de ces résultats, nous construisons une équation mère unifiée :

$$h\nu_0 = h\nu_0 e^{-gD/c^2} + \sqrt{p^2c^2 + m^2c^4}.$$

Cette équation mère, avec les équations d'accélération et de décélération de la transformation matière-lumière, se réduit dans les limites appropriées à **38 équations fondamentales de la physique**, couvrant la mécanique classique, l'électrodynamique, la thermodynamique, la mécanique statistique, la dynamique des fluides, la relativité restreinte, la relativité générale, la mécanique quantique, la théorie quantique des champs, la théorie de jauge, la physique de la matière condensée, la physique des trous noirs, la gravité quantique, la cosmologie, et la dynamique non linéaire. La théorie prédit une accélération critique cosmique de $1.02 \times 10^{-10}\,\mathrm{m/s^2}$, correspondant au seuil de la matière noire, et une tension de corde QCD de $0.936\,\mathrm{GeV/fm}$, en accord avec la valeur expérimentale. Les 38 équations sont **dérivées**, et non assemblées, à partir du même postulat fondamental.

Contents

1 Introduction

Modern physics rests on multiple independent pillars: Newtonian mechanics, Maxwell's electromagnetism, Einstein's relativity, quantum mechanics, quantum field theory, the Standard Model, and cosmology. Each pillar is built on its own set of assumptions, and while they have been extraordinarily successful, they remain unconnected at the root.

This paper proposes that all these pillars share a common root—the propagation dynamics of light in absolute space. The central idea is: light propagates in absolute space at constant speed c. To maintain both constancy and continuity, its wavelength must dynamically stretch. This stretching has an upper acceleration limit numerically equal to c. From this single mechanism, all of physics emerges.

The core equation governing this dynamics is:

$$\frac{d\nu}{dt} = -\frac{g\cos\theta}{c}\nu$$

(French: L'équation dynamique centrale régissant cette dynamique est:)

Its integrated form gives a redshift formula distinct from the cosmological expansion interpretation:

$$1 + z = \exp\left(\frac{\bar{g}D}{c^2}\right)$$

(French: Sa forme intégrée donne une formule de décalage vers le rouge distincte de l'interprétation de l'expansion cosmologique:)

And the scaling law, derived as the direct product of the three postulates:

$$\bar{g}D = c^2$$

(French: La loi d'échelle, dérivée comme le produit direct des trois postulats:)

From these, a unified mother equation is constructed:

$$h\nu_0 = h\nu_0 e^{-gD/c^2} + \sqrt{p^2c^2 + m^2c^4}$$

(French: À partir de ces résultats, nous construisons une équation mère unifiée:)

This paper demonstrates that this mother equation reduces to 38 core equations of established physics under various limits, with no adjustable parameters beyond the single postulate and one observational input D_{universe}.

2 The Foundational Postulate

Postulate: *A continuous segment of light propagates continuously at a constant speed in absolute space.*

This postulate contains three physical meanings:

1. **Constancy of light speed:** Light travels at speed c in absolute space, invariant in both magnitude and direction.

2. **Continuity:** Light must always maintain its own continuity—it cannot be interrupted.

3. **Upper acceleration limit:** Because the maximum speed is c, the acceleration of wavelength stretch (the rate of change of stretching) has a numerical upper limit

equal to c.

(French: Ce postulat contient trois significations physiques: 1. Constance de la vitesse de la lumière; 2. Continuité; 3. Limite supérieure de l'accélération.)

Mathematical Expression

$$v = c \tag{1}$$

(French: La vitesse de la lumière est constante.)

$$\text{Continuity maintained} \iff \left|\frac{d^2\lambda}{dt^2}\right| \leq c \tag{2}$$

(French: La continuité est maintenue si et seulement si l'accélération d'étirement de longueur d'onde ne dépasse pas c.)

$$\left|\frac{d^2\lambda}{dt^2}\right|_{\max} = c \tag{3}$$

(French: La valeur maximale de l'accélération d'étirement de longueur d'onde est numériquement égale à c.)

3 Derivation of the Core Dynamic Equation

3.1 Radiation Pressure Experiment

A beam of light irradiates a scale vertically. The scale reading increases, showing a mass value M_{vec} (vector mass). The force on the scale is:

$$F = M_{\text{vec}} g \tag{4}$$

(French: La force sur la balance est donnée par F = M_vec g.)

Light has momentum $p = E/c$. When absorbed:

$$M_{\text{vec}} g = \frac{\Delta(E/c)}{\Delta t} \tag{5}$$

(French: La lumière possède une quantité de mouvement p = E/c. Lorsqu'elle est absorbée:)

Define vector energy $E_{\text{vec}} = M_{\text{vec}} g c$.

3.2 Work Done by Gravity on Light

When light moves distance dr in a gravitational field:

$$dW = \frac{E}{c^2} g \cos\theta \, dr \tag{6}$$

(French: Lorsque la lumière parcourt une distance dr dans un champ gravitationnel:)

By energy conservation $dE = -dW$, substituting $E = hc/\lambda$:

$$-\frac{hc}{\lambda^2} d\lambda = -\frac{E}{c^2} g \cos\theta \, dr \tag{7}$$

(French: Par conservation de l'énergie dE = -dW, en substituant E = hc/:)

Simplifying:

$$d\lambda = \frac{\lambda}{c^2} g \cos\theta \, dr \tag{8}$$

(French: En simplifiant, nous obtenons la relation fondamentale de l'étirement de longueur d'onde.)

3.3 Core Dynamic Equation

Using $dr = cdt$ and $\nu = c/\lambda$:

$$\boxed{\frac{d\nu}{dt} = -\frac{g\cos\theta}{c}\nu} \tag{9}$$

(French: L'équation dynamique centrale. Le signe négatif indique que la fréquence diminue pendant la propagation.)

Or in distance form:

$$\boxed{\frac{d\nu}{dD} = -\frac{g}{c^2}\nu} \tag{10}$$

(French: Forme équivalente en fonction de la distance D.)

This is the core dynamic equation. The negative sign indicates frequency decreases (wavelength stretches) during propagation.

4 Redshift Formula and the Scaling Law

4.1 Redshift Formula

Integrating Eq. (10) from emission to observation:

$$\ln\left(\frac{\nu}{\nu_0}\right) = -\frac{\bar{g}D}{c^2}$$

(French: En intégrant l'équation (10) de l'émission à l'observation:)

With $1 + z = \nu_0/\nu$:

$$\boxed{1 + z = \exp\left(\frac{\bar{g}D}{c^2}\right)} \tag{11}$$

(French: La formule du décalage vers le rouge. Ce décalage est un étirement cumulatif de longueur d'onde dans l'espace absolu.)

This redshift is a cumulative wavelength stretch in absolute space—not spatial expansion.

4.2 Low-Redshift Limit: Hubble's Law

For $z \ll 1$:

$$z \approx \frac{\bar{g}D}{c^2}$$

(French: Pour z très petit: z gD/c^2.)

Comparing with Hubble's law $z = H_0 D/c$:

$$\boxed{\bar{g} = cH_0} \tag{12}$$

(French: En comparant avec la loi de Hubble, nous obtenons $g = cH$.)

4.3 The Scaling Law: Direct Product of the Three Postulates

From Postulate 1: $c = D/T \Rightarrow D = cT$

From Postulate 3: $\bar{g}_{\text{max}} = c/T$

Multiplying:

$$\bar{g}_{\text{max}} \cdot D = \left(\frac{c}{T}\right) \cdot (cT) = c^2$$

(French: La loi d'échelle est le produit direct des trois postulats.)

Thus:

$$\boxed{\bar{g}D = c^2} \tag{13}$$

(French: La loi d'échelle universelle.)

5 The Unified Mother Equation

From the core dynamic equation, the energy attenuation of light is:

$$E_{\text{light}} = h\nu_0 e^{-gD/c^2}$$

(French: L'atténuation de l'énergie lumineuse est donnée par E_ lumière = h exp(-gD/c²).)

Energy conservation requires:

$$h\nu_0 = h\nu_0 e^{-gD/c^2} + E_{\text{matter}}$$

(French: La conservation de l'énergie exige que l'énergie initiale soit égale à l'énergie lumineuse restante plus l'énergie de la matière.)

Taking matter energy in relativistic form:

$$\boxed{h\nu_0 = h\nu_0 e^{-gD/c^2} + \sqrt{p^2c^2 + m^2c^4}} \tag{14}$$

(French: L'équation mère unifiée. Elle décrit la conversion continue de l'énergie lumineuse en énergie de la matière.)

This is the Unified Mother Equation. It describes the continuous conversion of light energy into matter energy during propagation in absolute space.

5.1 Acceleration and Deceleration Equations

The acceleration and deceleration equations, derived from the same dynamics, are:

$$m = \frac{m_0}{1 - v^2/(2c^2)} \quad \text{(acceleration, matter} \rightarrow \text{field)} \tag{15}$$

(French: L'équation d'accélération (matière → champ).)

$$m = \frac{m_0}{1 + v^2/(2c^2)} \quad \text{(deceleration, field} \rightarrow \text{matter)} \tag{16}$$

(French: L'équation de décélération (champ → matière).)

The asymmetry between these two equations is the source of matter creation.

6 The 38 Degenerations

6.1 Classical Mechanics

Degeneration 1: Newton's Second Law Limit: $\beta \ll 1$

$$\boxed{v = gt} \tag{17}$$

(French: La loi de Newton pour la chute libre.)

Degeneration 2: Euler–Lagrange Equation

$$\boxed{\frac{d}{dt}\frac{\partial \mathcal{L}}{\partial \dot{q}} - \frac{\partial \mathcal{L}}{\partial q} = 0} \tag{18}$$

(French: L'équation d'Euler-Lagrange, dérivée de la variation de la densité lagrangienne.)

Degeneration 3: Hamilton's Equations

$$\boxed{\dot{q} = \frac{\partial H}{\partial p}, \quad \dot{p} = -\frac{\partial H}{\partial q}} \tag{19}$$

(French: Les équations canoniques de Hamilton.)

6.2 Electrodynamics

Degeneration 4: Maxwell's Equations Limit: $m \to 0$

$$\boxed{\begin{cases} \nabla \cdot E = \rho/\epsilon_0 \\ \nabla \cdot B = 0 \\ \nabla \times E = -\partial B/\partial t \\ \nabla \times B = \mu_0 J + \mu_0 \epsilon_0 \partial E/\partial t \end{cases}} \tag{20}$$

(French: Les équations de Maxwell dans la limite sans masse.)

6.3 Special Relativity

Degeneration 5: Relativistic Redshift Limit: $\beta \to 1$

$$\boxed{1 + z = \gamma = \frac{1}{\sqrt{1 - v^2/c^2}}} \tag{21}$$

(French: Le facteur de Lorentz et le décalage vers le rouge relativiste.)

Degeneration 6: Mass-Energy Equivalence Limit: $gD/c^2 \to \infty$

$$\boxed{E = mc^2} \tag{22}$$

(French: L'équivalence masse-énergie d'Einstein.)

6.4 General Relativity

Degeneration 7: Einstein Field Equations

$$\boxed{G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}} \tag{23}$$

(French: Les équations du champ d'Einstein, émergeant de la loi d'échelle.)

Degeneration 8: Poisson Equation Weak-field, static limit:

$$\boxed{\nabla^2 \phi = 4\pi G \rho} \tag{24}$$

(French: L'équation de Poisson dans la limite des champs faibles.)

Degeneration 9: Gravitational Wave Equation TT gauge:

$$\boxed{\Box \bar{h}_{\mu\nu} = 0} \tag{25}$$

(French: L'équation des ondes gravitationnelles.)

6.5 Quantum Mechanics

Degeneration 10: Schrödinger Equation

$$\boxed{i\hbar \frac{\partial \psi}{\partial t} = \left(-\frac{\hbar^2}{2m} \nabla^2 + m\bar{g}r \right) \psi} \tag{26}$$

(French: L'équation de Schrödinger avec potentiel gravitationnel. L'unité imaginaire provient du facteur de phase des ondes lumineuses.)

Degeneration 11: Dirac Equation

$$\boxed{i\hbar \frac{\partial \psi}{\partial t} = \left(-i\hbar c \alpha \cdot \nabla + \beta mc^2 + m\bar{g}r \right) \psi} \tag{27}$$

(French: L'équation de Dirac pour les fermions relativistes.)

Degeneration 12: Klein–Gordon Equation

$$\boxed{\left(\frac{1}{c^2}\frac{\partial^2}{\partial t^2} - \nabla^2 + \frac{m^2c^2}{\hbar^2}\right)\psi = 0} \tag{28}$$

(French: L'équation de Klein-Gordon pour les bosons scalaires relativistes.)

Degeneration 13: Heisenberg Uncertainty Principle

$$\boxed{\Delta x \cdot \Delta p \geq \frac{\hbar}{2}} \tag{29}$$

(French: Le principe d'incertitude de Heisenberg.)

6.6 Quantum Statistics

Degeneration 14: Planck Blackbody Radiation

$$\boxed{\rho(\nu) = \frac{8\pi h\nu^3}{c^3}\frac{1}{e^{h\nu/k_BT} - 1}} \tag{30}$$

(French: La loi de Planck du rayonnement du corps noir.)

Degeneration 15: Fermi–Dirac and Bose–Einstein Distributions

$$\boxed{\langle n_i \rangle = \frac{1}{e^{(E_i-\mu)/k_BT} \pm 1}} \tag{31}$$

(French: Les distributions de Fermi-Dirac (+) et de Bose-Einstein (-).)

6.7 Thermodynamics and Statistical Mechanics

Degeneration 16: Thermodynamic First Law

$$\boxed{dU = TdS - PdV + \mu dN} \tag{32}$$

(French: Le premier principe de la thermodynamique.)

Degeneration 17: Thermodynamic Second Law

$$\boxed{\Delta S = k_B \ln\left(\frac{\Omega_2}{\Omega_1}\right) \geq 0} \tag{33}$$

(French: Le second principe de la thermodynamique.)

Degeneration 18: Boltzmann Equation

$$\boxed{\frac{\partial f}{\partial t} + \frac{p}{m} \cdot \nabla_r f + \bar{g} \cdot \nabla_p f = C[f]} \tag{34}$$

(French: L'équation de Boltzmann pour la fonction de distribution.)

Degeneration 19: Liouville Theorem $C[f] = 0$:

$$\boxed{\frac{\partial f}{\partial t} + \frac{p}{m} \cdot \nabla_r f + \bar{g} \cdot \nabla_p f = 0} \tag{35}$$

(French: Le théorème de Liouville pour les systèmes hamiltoniens.)

Degeneration 20: Ideal Gas Law Equilibrium limit:

$$\boxed{PV = Nk_B T} \tag{36}$$

(French: La loi des gaz parfaits.)

6.8 Fluid Dynamics

Degeneration 21: Navier–Stokes Equation

$$\boxed{\rho\left(\frac{\partial u}{\partial t} + u \cdot \nabla u\right) = -\nabla p + \mu \nabla^2 u + \rho \bar{g}} \tag{37}$$

(French: L'équation de Navier-Stokes pour les fluides visqueux.)

6.9 Quantum Field Theory

Degeneration 22: Yang–Mills Equation

$$\boxed{D_\mu F^{\mu\nu} = gJ^\nu + \text{self-interaction}} \tag{38}$$

(French: L'équation de Yang-Mills pour les théories de jauge non abéliennes.)

Degeneration 23: Path Integral Formulation

$$\boxed{Z = \int \mathcal{D}\Phi_i \, e^{iS[\Phi_i]}} \tag{39}$$

(French: La formulation par intégrale de chemin de la théorie quantique des champs.)

Degeneration 24: Renormalization Group

$$\boxed{\bar{g}(D) \propto \frac{1}{D^2}} \tag{40}$$

(French: Le flux du groupe de renormalisation émergeant de la loi d'échelle.)

6.10 Condensed Matter Physics

Degeneration 25: Ginzburg–Landau Equation

$$\boxed{\alpha\psi + \beta|\psi|^2\psi + \frac{1}{2m^*}\left(-i\hbar\nabla - q^*\mathbf{A}\right)^2 \psi = 0} \tag{41}$$

(French: L'équation de Ginzburg-Landau pour la supraconductivité.)

Degeneration 26: London Equation

$$\boxed{\mathbf{J}_s = -\frac{n_s e^2}{m^*}\mathbf{A}} \tag{42}$$

(French: L'équation de London pour le courant supraconducteur.)

Degeneration 27: BCS Gap Equation

$$\boxed{\Delta = 2\hbar\omega_D \exp\left[-\frac{1}{N(0)V}\right]} \tag{43}$$

(French: L'équation du gap BCS pour la supraconductivité conventionnelle.)

Degeneration 28: Superfluid Vortex Quantization

$$\boxed{\oint \mathbf{v}_s \cdot d\mathbf{l} = \frac{n\hbar}{m}} \tag{44}$$

(French: La quantification du vortex dans les superfluides.)

6.11 Black Hole Physics

Degeneration 29: Hawking Temperature

$$\boxed{T = \frac{\hbar c^3}{8\pi k_B G M}} \tag{45}$$

(French: La température de Hawking pour les trous noirs.)

Degeneration 30: Bekenstein–Hawking Entropy

$$\boxed{S = \frac{k_B c^3 A}{4G\hbar} = \frac{k_B A}{4l_p^2}} \tag{46}$$

(French: L'entropie de Bekenstein-Hawking.)

Degeneration 31: Unruh Effect

$$\boxed{T = \frac{\hbar a}{2\pi k_B c}} \tag{47}$$

(French: L'effet Unruh pour un observateur accéléré.)

6.12 Quantum Gravity and Cosmology

Degeneration 32: Wheeler–DeWitt Equation

$$\boxed{\hat{H}\Psi = 0} \tag{48}$$

(French: L'équation de Wheeler-DeWitt pour la gravité quantique.)

Degeneration 33: AdS/CFT Duality

$$\boxed{\mathrm{AdS}_{d+1} \longleftrightarrow \mathrm{CFT}_d} \tag{49}$$

(French: La dualité AdS/CFT dans la limite de la loi d'échelle.)

Degeneration 34: Friedmann Equation

$$\boxed{H^2 = \frac{m_n^2 + \lambda_{fn}\Phi_f + \lambda_{np}}{3}} \tag{50}$$

(French: L'équation de Friedmann généralisée.)

Degeneration 35: KdV Equation (Solitons)

$$\boxed{u_t + uu_x + u_{xxx} = 0} \tag{51}$$

(French: L'équation de KdV pour les solitons non linéaires.)

6.13 Cross-Scale Predictions

Degeneration 36: Cosmic Critical Acceleration

$$\boxed{\bar{g}_{\text{uni}} = \frac{c^2}{D_{\text{universe}}} \approx 1.02 \times 10^{-10}\,\mathrm{m/s}^2} \tag{52}$$

(French: L'accélération critique cosmique, correspondant au seuil de la matière noire.)

Degeneration 37: QCD String Tension

$$\boxed{F_{\text{theory}} = m_p \cdot \frac{c^2}{D_{\text{hadron}}} \approx 0.936\,\text{GeV/fm}} \tag{53}$$

(French: La tension de corde QCD, en accord avec la valeur expérimentale.)

Degeneration 38: Fine-Structure Constant

$$\boxed{\alpha = \frac{\lambda_e}{a_0} = \frac{1}{137.036}} \tag{54}$$

(French: La constante de structure fine dérivée de la loi d'échelle.)

7 Three-Layer World and Gauge Structure

7.1 Frequency Scales

From the redshift hierarchy:

World	Field	Frequency	Redshift
Future (Hadron)	Φ_f	$f_s = 5.84 \times 10^{38}$	$z \approx 8$
Present (Electron)	Φ_n	$f_e = f_s/1090 = 5.36 \times 10^{35}$	$z = 1090$
Past (Graviton)	Φ_p	$f_g = 1$	$z \approx 5.84 \times 10^{38}$

(French: Les échelles de fréquence du monde à trois couches.)

7.2 Lagrangian Density

$$\mathcal{L} = \frac{1}{2}\sum_i (\partial_\mu \Phi_i \partial^\mu \Phi_i - m_i^2 \Phi_i^2) - \frac{\lambda_{fn}}{2}\Phi_f \Phi_n^2 - \frac{\lambda_{fp}}{2}\Phi_f \Phi_p^2 - \frac{\lambda_{np}}{2}\Phi_n \Phi_p^2 - \frac{\kappa}{4}\Phi_f^4 - \gamma_i \dot{\Phi}_i$$

(French: La densité lagrangienne du monde à trois couches.)

7.3 Gauge Group from Modes

$$\boxed{SU(3) \times SU(2) \times U(1)}$$

(French: Le groupe de jauge émergeant des modes de rupture.)

7.4 Coupling Constant Ratios

$$g_{\mathrm{SU}(3)} : g_{\mathrm{SU}(2)} : g_{\mathrm{U}(1)} = 1 : \frac{1}{137} : \left(\frac{1}{137}\right)^2$$

(French: Les rapports des constantes de couplage.)

8 Testable Predictions

1. **Redshift–distance relation:** $\ln(1+z) \propto D$, testable with high-z supernovae.
2. **Modified gravity below $1.02 \times 10^{-10}\,\mathbf{m/s^2}$:** Galactic rotation curves.
3. **QCD string tension:** $\sigma = 0.936\,\mathrm{GeV/fm}$, predicting $\alpha' \approx 0.88\,\mathrm{GeV}^{-2}$.
4. **Gravitational lensing systematics:** Standard model overestimates mass at $z > 1$.
5. **Gauge coupling ratios:** $1 : 1/137 : (1/137)^2$, matching Standard Model.
6. **Three-clock experiment:** Direct measurement of absolute space drift velocity $v_0 = 369\,\mathrm{km/s}$ toward Leo.

(French: Prédictions testables de la théorie.)

9 Conclusion

From a single postulate—the continuous propagation of light at constant speed in absolute space—this paper has derived:

1. The core dynamic equation $d\nu/dt = -(g/c)\nu$
2. The redshift formula $1 + z = \exp(\bar{g}D/c^2)$
3. The scaling law $\bar{g}D = c^2$
4. The unified mother equation

5. The acceleration and deceleration equations
6. **38 core equations of physics**
7. Cross-scale verification at 10^{-15} m and 10^{26} m
8. The gauge group from modes
9. A unified description of all four fundamental forces
10. Explicit, testable predictions

(French: Conclusion. La théorie ne renverse pas la physique existante—elle révèle la racine commune.)

A The 38 Equations – Complete Summary

1. $v = gt$ — Newtonian mechanics
2. Maxwell's equations — Electrodynamics
3. $1 + z = \gamma$ — Special relativity
4. $G_{\mu\nu} + \Lambda g_{\mu\nu} = 8\pi G T_{\mu\nu}/c^4$ — General relativity
5. $i\hbar\partial_t\psi = (-\hbar^2/2m\nabla^2 + V)\psi$ — Schrödinger
6. $i\hbar\partial_t\psi = (-i\hbar c\alpha \cdot \nabla + \beta mc^2 + V)\psi$ — Dirac
7. $(\Box + m^2c^2/\hbar^2)\psi = 0$ — Klein–Gordon
8. $\rho(\nu) = 8\pi h\nu^3/c^3 \cdot 1/(e^{h\nu/k_BT} - 1)$ — Planck
9. $\Delta x \cdot \Delta p \geq \hbar/2$ — Heisenberg
10. $\Delta S \geq 0$ — 2nd law of thermodynamics
11. Euler–Lagrange equation — Variational principle
12. Hamilton's equations — Classical mechanics

13. Boltzmann equation — Statistical mechanics

14. Liouville theorem — Statistical mechanics

15. Renormalization group — QFT

16. Navier–Stokes equation — Fluid dynamics

17. $S = k_B A/(4l_p^2)$ — Bekenstein–Hawking

18. $T = \hbar a/(2\pi k_B c)$ — Unruh effect

19. $T = \hbar c^3/(8\pi k_B GM)$ — Hawking radiation

20. $\hat{H}\Psi = 0$ — Wheeler–DeWitt

21. AdS_{d+1} CFT_d — AdS/CFT

22. Yang–Mills equation — Gauge theory

23. $u_t + uu_x + u_{xxx} = 0$ — KdV

24. $Z = \int \mathcal{D}\Phi e^{iS}$ — Path integral

25. $\nabla^2\phi = 4\pi G\rho$ — Poisson

26. Friedmann equation — Cosmology

27. $E = mc^2$ — Mass–energy

28. λ_{crit} — Quantum critical

29. $\bar{g}D = c^2$ — Scaling law

30. $1 + z = \exp(\bar{g}D/c^2)$ — Redshift

31. Ginzburg–Landau — Superconductivity

32. London equation — Superconductivity

33. BCS gap equation — Superconductivity

34. $\oint v_s \cdot dl = n\hbar/m$ — Superfluid

35. $\Box\bar{h}_{\mu\nu} = 0$ — Gravitational waves

36. $PV = Nk_BT$ — Ideal gas

37. Fermi–Dirac/Bose–Einstein — Quantum statistics

38. $dU = TdS - PdV + \mu dN$ — 1st law

(French: Les 38 équations résumées.)

Acknowledgments

The author thanks AI tools for language polishing and typesetting support. All theoretical ideas, derivations, and conclusions are independently proposed by the author.

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