Key Contributions of the PPC framework in terms of Equations

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"Pawan Upadhyay's Pressure–Curvature Law of Gravity (PPC Law), developed as an interpretive framework within General Relativity."

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- **Key contributions of the PPC framework:**

- Einstein's field equations and geodesic motion equations are **retained unchanged**
- New **symbols and pressure-based relations** are introduced for physical interpretation
- Gravity is explained through pressure generated by energy density

- **New equations and symbols introduced in PPC:**

- Energy density:
  $E_d = \frac{E}{V}$
- Mass–energy form:
  $E_d = \rho c^2$
- Gravitational pressure:
  $P_g = wE_d$
- Pressure–gradient (field) force:
  $\mathbf{F}_{field} = -\nabla P_g$
- Surface pressure force on extended bodies:
  $F_p = P_g A$

- **Conceptual structure:**

Energy Density → Pressure → Spacetime Curvature → Geodesic Motion

All equations related to the field force and surface force in Pawan Upadhyay's Pressure–Curvature Law of Gravity were created by me.

The relation $E_d = \rho c^2$ **is my equation, derived from Einstein's mass–energy equivalence** $E = mc^2$.

The PPC framework aims to bridge mathematical General Relativity with physical intuition, particularly through the role of pressure in curvature and motion. I welcome thoughtful academic discussion and engagement.

"This work is developed with deep respect for Albert Einstein's contributions to physics. All fundamental equations of General Relativity are retained, and the PPC framework is presented as an interpretive extension built upon Einstein's theory."

Point by Point List of Equations introduced in the PPC Law of Gravity by me

Point-by-Point List of Equations Introduced in the PPC Law of Gravity

1. Energy Density (General Definition)

$E_d = \frac{E}{V}$

- Introduces the symbol E_d as a central quantity in the PPC framework

2. Mass–Energy Density Relation

$E_d = \rho c^2$

- Connects mass density directly to energy density

3. Gravitational Pressure Relation

$P_g = wE_d$

- Links gravitational pressure to energy density
- w represents the equation-of-state parameter

4. Pressure–Energy Equivalence (Special Case)

$P_g = E_d$

- Used to describe ultra-relativistic or extreme gravitational conditions

5. Field Force (Pressure Gradient Force)

$\mathbf{F}_{field} = -\nabla P_g$

- Introduced as an **effective force interpretation**, not a new fundamental force

6. Surface Force (Pressure Acting on Area)

$F_p = P_g A$

- Applied to planets, stars, and bounded regions

7. Stress–Energy Tensor Trace Relation

$T = \rho c^2 - 3p$

- Appears in the relativistic formulation retained from General Relativity

8. High-Pressure Trace–Energy Relation

$T = -2E_d$

- Represents the trace behavior in high-pressure gravitational regimes

9. Unified PPC Equation Chain

$\rho \to E_d \to P_g \to (\mathbf{F}_{field}, F_p) \to \text{Spacetime Curvature} \to \text{Geodesic Motion}$

- Provides physical interpretation without altering Einstein's equations

"Einstein's General Relativity provides the mathematical foundation upon which the PPC interpretive framework is constructed."

— Pawan Upadhyay
Independent Researcher
(Pawan Upadhyay's Pressure–Curvature Law of Gravity)