# Dimensional Analysis

## Energy–Work Relation

$$E = t \cdot g$$

$$[t] = \mathrm{s}, [g] = \mathrm{J} \cdot \mathrm{s}^{-1}$$

$$\Rightarrow [E] = \mathrm{J}$$

This confirms that field allowance $g$ represents a rate of structured work.

## Work Density

$$\rho_W = \frac{1}{V} \frac{dW}{dt}$$

$$[dW/dt] = \mathrm{J} \cdot \mathrm{s}^{-1}, [V] = \mathrm{m}^3$$

$$\Rightarrow [\rho_W] = \mathrm{J} \cdot \mathrm{s}^{-1} \cdot \mathrm{m}^{-3}$$

This quantity governs singularity formation and structural instability.

## Wave Energy Transport

$$\frac{dE_{\text{wave}}}{dx} \approx 0$$

$$[E_{\text{wave}}] = \mathrm{J}, [x] = \mathrm{m}$$

Energy conservation during propagation implies that losses occur only at interaction events.

## Phase Cancellation

$$\psi_1 + \psi_2 = 0$$

Field amplitude cancellation does not imply zero transported energy; the dimensionality of $\psi$ depends on normalization and interaction mechanism.

## Condensation Threshold

$$E_{\text{local}} \geq E_{\text{cond}}$$

$$[E_{\text{cond}}] = \mathrm{J}$$

This condition is dimensionally equivalent to known pair-production thresholds and allows direct comparison with astrophysical energy densities.

## Gravitational Interpretation

$$a_{\text{grav}} \sim \nabla g$$

$$[\nabla g] = \text{J} \cdot \text{s}^{-1} \cdot \text{m}^{-1}$$

To recover acceleration units:

$$a_{\text{grav}} \sim \frac{\nabla g}{m}$$

$$\Rightarrow [a] = \text{m} \cdot \text{s}^{-2}$$

This shows that gravitational acceleration arises from gradients of field allowance normalized by mass.

## Reversibility Limit

$$\lim_{\text{coherence} \to 1} E_{\text{matter}} \to E_{\text{wave}}$$

Both quantities retain energy dimension (J), confirming consistency at the theoretical boundary between matter and wave states.