# Email Template for Sharing Temporal Flow Theory

## Subject Line:

Request for feedback on Temporal Flow Theory: A unified approach to quantum mechanics, gravity, and cosmology

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Dear [Professor/Dr. Recipient's Name],

I hope this email finds you well. My name is Matthew Payne, an independent researcher who has developed a theoretical framework that I believe offers a novel approach to several fundamental questions in physics. I am reaching out based on your work in [mention specific relevant research area, e.g., "entropic gravity," "quantum foundations," etc.], which has conceptual connections to my research.

## About the Theory

I have developed what I call "Temporal Flow Theory," which redefines time as a dynamic four-vector field (Wμ) derived from entanglement entropy gradients with scale-dependent coupling. The framework aims to unify quantum mechanics, gravity, and cosmology through a single mathematical structure.

The theory's core features include:

- A temporal flow field defined as Wμ = η∇^μSent, where Sent represents entanglement entropy

- A scale-dependent coupling function that bridges quantum and classical regimes

- Spacetime geometry emerging from entanglement entropy gradients

- Explicit mechanisms for quantum-classical transitions and dark phenomena

## Specific Predictions

What distinguishes this approach from speculative frameworks is its generation of specific, testable predictions, including:

1. Quantum interference shifts at ∆φ ≈ 2.1 × 10-6 rad, detectable in microscale interferometry experiments

2. Galactic rotation curve deviations that differ from ΛCDM by 4.7% at r = 8 kpc

3. A predicted Hubble parameter of H₀ = 70.5 ± 0.7 km/s/Mpc, potentially resolving the tension between Planck and SH0ES measurements

## Request for Feedback

I would greatly value your perspective on specific aspects of this work, particularly:

- The mathematical consistency of the framework

- The feasibility of the proposed experimental tests

- Potential connections to your research in [specific area]

I understand the demands on your time and would appreciate any level of engagement you can offer, from brief comments to more detailed discussion.

## Materials

I have attached a concise (2-page) summary of the theory, focused on its mathematical structure and key predictions. The full paper is also available upon request.

Thank you for considering this unconventional approach. I am open to critical feedback and see it as essential to refining these ideas.

Sincerely,

Matthew W. Payne

Independent Researcher

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## Two-Page Summary Attachment Content

# Temporal Flow Theory: Executive Summary

## Core Mathematical Framework

Temporal Flow Theory redefines time as a dynamic four-vector field derived from entanglement entropy gradients:

Wμ = η∇μSent

where:

- η = α·(ħ/m\_Pl·c)·(m\_Pl/m₀)(1/2) ≈ 6.7 × 10^27 J·s/kg·m

- Sent represents von Neumann entropy: Sent = -kB Tr[ρ ln ρ]

The theory introduces a scale-dependent coupling function:

g(r) = 1/(1+(r/r\_c·f(r))²)

where:

- r\_c ≈ 8.7 × 10-6 m (quantum coherence scale)

- f(r) = (r/r\_gal)(1/2) (scaling function)

- rgal ≈ 1019 m (galactic scale)

This coupling function enables quantum behaviors at small scales (g→1) while approaching classical physics at larger scales (g→0).

The modified action takes the form:

S = ∫d⁴x√(-g)[R/16πG + (∇μWν)(∇μWν)/2 - V(W) + gunified WμJμtotal + Lmatter + LUV]

leading to the field equation:

∇μ∇μWν + g(χ)Wμ∇μWν + RνμWμ = -∂V/∂Wν + gunified Jtotal,ν

## Key Predictions

1. \*\*Quantum interference\*\*: I(x) = I₀[1 + cos(kx)][1 + μg(r)|W|²]

- Predicted phase shift: ∆φ ≈ 2.1 × 10-6 rad

- Testable in SiN membrane interferometry at T ≈ 10 mK

2. \*\*Galactic rotation curves\*\*:

- Modified dark matter density profile with 4.7% deviation from SPARC data at r = 8 kpc

- Small oscillatory component with period ≈ 250 Myr

3. \*\*Cosmological parameters\*\*:

- H(z) = H\_ΛCDM(z)·√(1 + 0.038|W|²((1+z)/(1+0.7))0.14)

- Predicted H₀ = 70.5 ± 0.7 km/s/Mpc

- Reconciles Planck (67.4 ± 0.5) and SH0ES (73.0 ± 1.0) measurements

4. \*\*Quantum collapse mechanism\*\*:

- P(collapse) = |⟨ψ|φ⟩|²[1 + g(χ)(κWμWμ + λWμ∇μ(|ψ|²/|ψ|²))]

- Provides deterministic mechanism for wave function collapse

## Numerical Validation

Results have been validated through "TempFlowSim" simulations across:

- Quantum scales (r ~ 10^10 m)

- Galactic scales (r ~ 1021 m)

- Cosmological volumes (103 Mpc³)

## Experimental Proposals

1. \*\*Quantum regime\*\*:

- Enhanced interferometry with SiN membranes at ultra-low temperatures

- BEC coherence measurements (predicted τ\_coh,BEC ≈ 10 s)

2. \*\*Classical regime\*\*:

- High-precision torsion pendulum (τ ≈ 10-15 N·m)

3. \*\*Cosmological regime\*\*:

- SKA pulsar timing arrays (hW ≈ 8.4 × 10-16)

- DESI BAO measurements at z = 0.5-1.5

## Distinctive Features

Unlike other unification attempts, Temporal Flow Theory:

- Provides explicit scale-transition mechanisms

- Makes precise, testable predictions across multiple scales

- Offers natural explanations for quantum measurement, dark phenomena, and cosmological tensions

- Maintains compatibility with well-established physics in appropriate limits