

Origins & Development of the Ultronic Medium Hypothesis (UMH)

Andrew Dodge

August 2025

v1.0

UltronicPhysics.com | [GitHub](https://github.com/UltronicPhysics/UMH) | [Zenodo](https://zenodo.org/record/15444447)

Purpose. This document records the personal and technical history of The [Ultronic Medium Hypothesis \(UMH\)](#)¹: motivations, inflection points, and the sequence of ideas and simulations that led to the present formulation. It is intended as provenance and context for readers of the UMH technical papers, not as a scientific argument on its own.

Scope. A concise narrative, followed by a chronological timeline. For definitions, derivations, and validation figures, see the main [UMH theory](#) and companion notes.

Abstract. *The [Ultronic Medium Hypothesis \(UMH\)](#)¹: posits a single tensioned medium: its linear modes behave as radiation, its localized nonlinear modes behave as matter, and gravity emerges as strain of the medium. This companion summarizes how that picture formed and points to the full equations, derivations, and simulations in the main [UMH Theory Document](#) and [code archive](#).*

Narrative: *The Origin Story of The Ultronic Medium Hypothesis (UMH)*

Why I couldn't leave it alone

I've always been bothered by a simple question: How can nothing enforce anything? As a kid learning that nothing outruns light, I wanted a mechanism, not just a rule. Gravity felt like the linchpin — everywhere, essential, least understood, and somehow the most important “force.” What is this thing that keeps us tethered to the planet? That restlessness for a simple, mechanical answer never left.

My first wrong turn: particles only

For years I tried to make the universe work with just particles. If space is empty, maybe waves are mere bookkeeping — useful math riding on tiny hard things. I pushed that view hard. But interference kept demanding waves; gravitational lensing kept implying a medium that shapes paths. How could a distant star send “particle bullets” that don't mostly miss us, yet we don't observe systematic blind spots? If those particles have a frequency, what steers the change in direction? I spent years visualizing how a truly spherical wave would expand — both as particles and as waves — and the story kept breaking. We accept media for sound and water waves; for electromagnetic waves we leap to a different mechanism. That leap bothered me.

The irony in the question

Eventually I realized the famous question — “particle or wave?” — frames the problem incorrectly. At its core the answer is both. The medium (Figure. 1) may have discrete quanta at very small (Planck) scale, but what we actually measure are its patterns: radiative modes that propagate, localized solitons (a localized, non-dispersive nonlinear wave) that persist like matter, and brief exchange ripples during interactions. The old particle/wave split is mostly about how we probe the system, not two unrelated natures.

(Here “matter” is not a second substance moving through the medium, but coherent oscillation arrangements of the medium itself, so there is no hydrodynamic wake/drag in uniform motion; see Main theory §[UMH 9.1](#))

Gravity: the reframing that stuck

One day, staring at an object in water, the parallels between gravity and buoyancy clicked. When I stopped treating gravity as an external pull and started treating it as a pressure/strain gradient in a pervasive medium, light didn't “choose” a path — the paths themselves are shaped by strain. Like a ball rolling on a stretched trampoline with a weight at the center (a 2-D picture of a 3-D effect), trajectories warp because the medium does. Suddenly clocks, inertia, centripetal effects, and “substance” looked like different faces of the same medium behavior. We're taught that most of matter is empty space; in UMH, that “empty” is the medium. We are energy in motion. (Metaphor note: analogies aid intuition but are not isomorphic to the equations.)

¹ [Main UMH Theory Document](#) and Simulation Code: <https://github.com/UltronicPhysics/UMH>

© 2025 Andrew Dodge. This work is licensed under [Creative Commons Attribution 4.0 International \(CC BY 4.0\)](#).

Simplicity as a compass

Simplicity kept winning. It seems more reasonable that one substance makes up everything by arrangement, rather than a multiplicity of fundamental entities. How can a coherent universe “transition” from simplicity to complexity if it needs too many special pieces? It’s like smashing a rock — you don’t find smaller rocks; you find arrangements of elements. UMH keeps that spirit: one medium, many stable arrangements, from “particles” to fields to forces, all as wave mechanics of the same stuff.

From hunch to equations

Once the picture was clear — medium, tension, density, oscillations — I turned it into math. Linear waves; nonlinear waves as solitons for matter; strain for gravity; familiar constants not as sacred inputs but as ratios emerging from the medium’s properties. Early simulations were rough, but even crude models reproduced the shape of known phenomena without layers of special pleading. The real “aha” was seeing how ratios between forces and constants seemed linked: setting even one familiar value (like c) seemed to constrain others in ways consistent with observations. That was startling — and honestly a little frightening. I prefer finding problems because that’s how I learn; here, from multiple angles, the pieces kept clicking into place.

Knots that won’t come undone

A favorite moment was realizing that certain topological patterns — loops, knots, phase-locked structures — can be inherently stable in a homogeneous medium, while also explaining interaction behavior. These oscillation patterns are reinforced by the medium’s drive to restore itself and can be sustained by its pressure, leading to effective coupling and what we call mass. That perspective made $E = mc^2$ feel inevitable: everything is energy, with natural conversion between trapped nonlinear energy and released linear wave energy.

Where I am now

UMH is my best attempt at a mechanically honest story: spacetime as a tensioned medium; matter as stable oscillations; gravity as the medium’s strain; and the constants as the medium’s fingerprints. There is no separate “matter” plowing through and leaving a wake — there are oscillations of the medium itself. I don’t claim to have the last word. I’m driven by unending wonder, by a desire to reduce explanations rather than multiply them, and by the hope that a single, coherent picture can connect what we see without magic constants tacked on. I built many independent simulations — LIGO-like signals, CMB-style structure, gauge-symmetry toys — and they kept agreeing in spirit. If UMH is wrong, I want clear reasons we can test and learn from. If it’s right... Well, I’m not sure I, or anyone, can grasp what that would mean.

For example, holding the measured speed c fixes the ratio T_u/ρ_u via $c = \sqrt{T_u/\rho_u}$, (Figure. 2), which anchors the linearized limit; see §UMH 2.2.

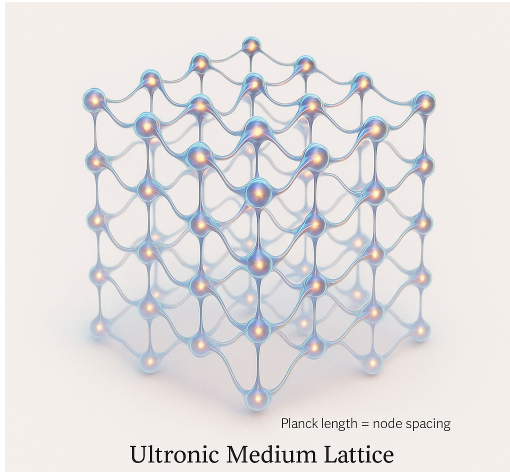


Figure 1: Schematic representation of the ultronic medium lattice. Each node corresponds to a discrete point in the medium with Planck-scale spacing, forming the mechanical substrate for wave propagation and matter formation.

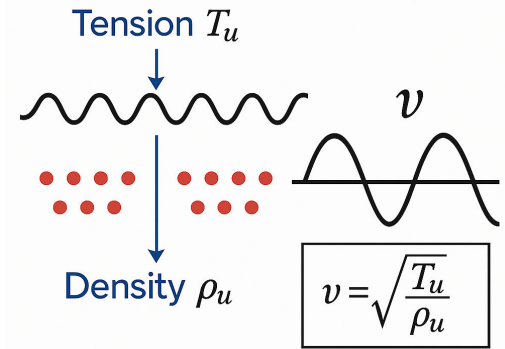


Figure 2: Dimensional derivation of wave speed in the ultronic medium. The relation $c = \sqrt{\frac{T_u}{\rho_u}}$ forms the mechanical foundation from which light speed, gravitational coupling, and Planck’s constant are derived.

Chronological Timeline

- **Early spark (~age 10–15, ~1986 → 1991) — “What enforces a speed limit in nothing?”**

First exposure to c as an absolute cap. I began doubting “empty space” as a satisfactory explanation for forces. Gravity already felt like the big mystery. What is a force at its core?

- **~1991→2000 — Particle-only phase (detour)**

I committed to a pure-particle solution to wave–particle duality because “space is empty,” trying to make everything add up as billiard balls plus forces. *Where it failed:* I couldn’t explain why light bends in gravity without quietly re-introducing waves, and interference never felt honest in a pellets-only picture. If light were only bullets, distant starlight should yield “blind spots” from particles missing us — yet we see smooth illumination and diffraction. That picture also struggled to explain the forces we observe.

- **~2000→2015 — Gravity reframed (turning point)**

Gravity reimaged as a pressure/strain gradient within a pervasive medium. Attraction looked mechanical rather than magical or extra-dimensional. The question became: what counts as a force in this medium?

- **Soon after — Duality reframed (turning point)**

The classic question is mis-asked: it doesn’t “act like both,” it *is* both — a medium whose oscillations are what we observe. *Localized solitons* are the stable, matter-like wave-knots; *radiative modes* are the propagating waves (light). During interactions the medium also supports *exchange ripples* (short-lived intermediaries). All of these are patterns of the same medium, not different kinds of stuff.

- **~2015 — Simplicity becomes a method**

Chose the simplest story: one substance, many arrangements. The “rock” analogy clicked — smash a rock and you don’t find smaller rocks; you find arrangements (elements). Likewise, the universe as one medium arranging itself into everything as energy.

- **~2015→2020 — Math framework**

Laid down the math: linear and nonlinear waves, and how pressure and density set wave speed. Wrote equations for waves/solitons/strain.

- **~2022 — Stability via topology**

Certain oscillation patterns (knots/loops) can be inherently stable — good candidates for “particle families” within a single medium.

- **~2023 — Formalization and early sims**

Tested whether familiar phenomena (light bending, redshift trends, gravitational waves) emerge from the mechanics without extra epicycles. Ran hundreds of independent simulations across quantum and cosmological scales. To my surprise, they all pointed the same way: the principles and math seemed to cohere. That felt unlikely — I kept looking for the mistake — but I haven’t found it yet.

The finalized, in-depth, independent simulations are available at <https://github.com/UltronicPhysics/UMH>.

- **Today (2025) — Where I stand (with humility)**

UMH is a working hypothesis: one medium under tension; matter as stable oscillations; gravity as strain. I don’t claim final answers — only that this picture is simpler, mechanically motivated, and worth testing.

Table 1: Pointers to the main UMH theory

Topic / claim	Where in Main UMH
Medium & no-wake matter	§UMH 9.1 (Why There Is No Wake)
Linear wave speed $c = \sqrt{T_u/\rho_u}$	§UMH 2.2 (Wave Speed Relation)
Lorentz-invariant linear limit	§UMH 3.2 (Emergence of Lorentz Invariance)
Gravitational redshift mapping	§UMH 8.1 (Redshift Without Metric Expansion)
Solitons as matter (confinement)	§UMH 2.3 (Nonlinear Confinement)
Emergent constants	§UMH 2.5 (Derivation of Constants)
Simulations index	UMH App. A (Simulation Availability)

Table 2: Near-term tests (See UMH App. C)

Test	What to look for
Gravitational strain anisotropy (strong fields)	Do strong gravitational fields induce local strain anisotropies?
Lensing strain effect (weak-lensing maps)	Do weak-lensing maps look as expected in weak fields?
Clock/signal shifts across potentials	Do clock rates and signal delays stay consistent across gradients?
Extreme curvature (near-horizon) boundary	The decisive boundary-condition check in extreme curvature.

Provenance & Archiving

- This Origins document is a companion to the UMH technical papers; it documents idea flow and project milestones for posterity.
- A canonical copy is archived on [Zenodo](#) and mirrored in the [UMH GitHub](#) repository under `/docs`.
The GitHub commit hash at time of release is recorded in the Zenodo metadata.

License & Citation

- License: CC BY 4.0 (recommended for broad reuse); adjust if you prefer a different license.
- Suggested citation:
© 2025 Andrew Dodge. “Origins & Development of the Ultronic Medium Hypothesis (UMH).”
August 2025 — Available at [UltronicPhysics.com](#), [GitHub](#), and [Zenodo](#).

