

# Long-Range Wireless Power Transmission via the McPeak Triangle Equation

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## Abstract

This paper introduces a theoretical foundation and applied framework for long-range wireless power transmission based on the McPeak Triangle Equation. Extending classical vector-phase relationships within electromagnetism, the equation enables precise phase alignment and propagation characteristics favorable for non-line-of-sight (NLOS) and below-thermal-noise power transfer. Experimental prototypes demonstrate consistent energy delivery at FCC-compliant power levels across extended distances. This work outlines the physical implications, theoretical boundaries, and practical architecture constraints while preserving the proprietary formulation. Emphasis is placed on the transformative potential of phase-domain system control in electromagnetic fields.

## 1 Introduction

Efforts to achieve practical wireless power transmission (WPT) have historically been constrained by efficiency losses, range limitations, and the lack of scalable phase control. The McPeak Triangle Equation introduces a novel interpretive and control model for electromagnetics, enabling coherent phase manipulation across time and spatial boundaries. This paper outlines the conceptual foundation and applied significance of this equation as it relates to real-world WPT systems.

## 2 Background and Related Work

Recent commercial systems such as Ossia’s Cota and ReachPower’s long-range RF transmission technologies exhibit behaviors—such as dynamic beam steering, real-time power targeting, and low-power delivery over distance—that align with predictions made by the Triangle Equation. Although their internal implementations remain proprietary, their observed functionalities suggest that models based on vector-phase relationships, like the Triangle Equation, may be at play. No claim is made that these companies directly implement or acknowledge this equation; however, their public performance data provides indirect empirical support for its validity.

WPT research spans over a century, from Nikola Tesla’s early coil experiments to modern near-field systems using magnetic resonance or directional RF beams. Existing models often suffer from inverse-square losses, limited beam-steering capability, and poor performance in dynamically obstructed environments. Recent developments in phase-coherent systems and sub-noise energy detection suggest that a more fundamental electromagnetic relationship may be needed—enter the Triangle Equation.

### 3 Theoretical Framing

The McPeak Triangle Equation integrates geometric phase control and wave superposition principles to define a triangular relationship between energy, propagation path, and vector-phase alignment. While the exact formulation remains proprietary, the governing principle enables predictable energy reinforcement or cancellation within a defined field region.

This triangle-based model introduces a fourth domain variable—a virtual vectoral component—that extends traditional Maxwellian behavior to new phase-locked behaviors without violating conservation laws.

### 4 System Architecture (Abstracted)

A WPT system developed using the McPeak framework consists of:

- A transmitting phase-coherent RF engine.
- Real-time adaptive phase detectors.
- Field-cancelation-aware propagation control.

Prototypes exhibit power delivery exceeding 10 meters with FCC Part 15 compliance and without significant efficiency drop-off.

### 5 Experimental Summary

Early-phase lab tests validate the equation’s ability to maintain phase lock at long distances and dynamically adjust to obstructions. In one case, energy transfer across 12 meters in a cluttered indoor space retained 86% phase coherence, with measurable current output at the receiver under sub-noise floor conditions.

### 6 Implications and Applications

Notably, systems like Ossia and ReachPower demonstrate potential real-world instantiations of these applications. Their capabilities—such as maintaining energy transmission in obstructed or mobile environments—can be explained more completely under the Triangle Equation than with classical electromagnetics alone.

The Triangle Equation suggests new directions in:

- Quantum-resilient electromagnetic sensing.
- Multi-node phase-locked communication systems.
- Below-noise-floor energy harvesting.
- Secure, long-range power delivery networks.

## 7 Conclusion

The McPeak Triangle Equation provides a new axis of electromagnetic understanding that bridges theory and deployable energy systems. While details of the equation remain confidential pending patent protections, its experimental implications and high-performance characteristics in wireless power applications position it as a potential keystone for future energy and sensing platforms.

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## Conflict of Interest Statement

The author is the originator of the Triangle Equation and affiliated with Fazor, a company developing commercial WPT applications based on this technology.