Alma, Illinois
EIN (38-3703545)
quantumaetherdynamics.org
aetherwizard@gmail.com
(618)-359-2486

BioAetherDynamics Conductance Meter: A QMU-Based Approach for Biological Diagnostics

David W. Thomson, CEO Quantum AetherDynamics Institute

Abstract

The Quantum AetherDynamics Institute (QADI), a 501(c)(3) non-profit based in Alma, Illinois, proposes the BioAetherDynamics Conductance Meter, a novel bioimpedance device leveraging the Aether Physics Model (APM) and Quantum Measurement Units (QMU). The meter measures biological conductance ($Cd = capc \cdot freq = \frac{1}{mflx}$) as reciprocal to magnetic flux, challenging the Standard Model's $G = \frac{1}{R}$ paradigm. Designed for applications in edema detection, neural function monitoring, and stress assessment, it targets the $1B bioimpedance and $50B wearables markets. A critical test (100 Hz–10 MHz, <2% error) with UIUC and Fermilab will validate QMU's accuracy against SI conductance. QADI, led by David W. Thomson, offers 18 non-peer-reviewed papers (quantumaetherdynamics.org/#research), seeking ImpediMed's expertise to fund prototyping ($50,000–$100,000) and production, with Illinois' VISTA ($500K–$1M) and INVENT ($100K–$200K) reducing risk. QADI requests 3% royalties, 2% equity, and a $20,000 stipend, offering a co-owned QMU algorithm patent.

1. Introduction

Bioimpedance technology, exemplified by ImpediMed's SFB7 analyzer, is critical for diagnosing conditions like lymphedema and edema. However, limitations in sensitivity and frequency range hinder broader applications, such as neural function or stress monitoring. The Aether Physics Model (APM), developed by David W. Thomson and Jim D. Bourassa, proposes a novel framework where conductance (Cd) is reciprocal to magnetic flux ($mflx$), not resistance, using Quantum Measurement Units (QMU). The BioAetherDynamics Conductance Meter applies this

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framework to enhance bioimpedance diagnostics, offering higher accuracy and new clinical insights.

This paper presents the meter's technical design, clinical applications, and commercial potential, addressing ImpediMed's expertise in bioimpedance. While APM is non-peer-reviewed, requiring experimental validation, quantumaetherdynamics.org/#research provides a robust theoretical basis in its 18 foundational papers. QADI, based in Alma, Illinois, seeks ImpediMed's partnership to prototype and test the meter, leveraging Illinois' quantum ecosystem, including potential collaboration with the Illinois Quantum and Microelectronics Park (IQMP), UIUC's IQUIST, and Fermilab, to validate novel theories while operating remotely. ImpediMed's expertise in multi-frequency bioimpedance, as demonstrated by the SFB7, positions it ideally to co-develop this innovative device. Thomson will lead theoretical development, with ImpediMed's R&D team handling hardware and UIUC supporting testing.

2. Foundational Concepts of APM and QMU

APM posits a dynamic Aether medium composed of quantum units, redefining fundamental physics:

- **Singularity**: A dimensionless origin for matter and forces, enabling unified dynamics (Unifying Physics with the Aether, 2022).
- **Aether Units**: Quantum rotating magnetic fields with electrostatic (spherical, full spin) and magnetic (toroidal, half-spin) charges (${e_{emax}}^2 = 1.400 \times 10^{-37} coul^2$).
- **Chronovibration**: Chronovibration, a temporal oscillation, structures Aether units, supporting QMU's dynamic measurements. (Unifying Physics with the Aether, 2022).
- **QMU**: Uses quantum constants (electron mass m_e), Compton wavelength (λ_C), quantum frequency ($F_q = \frac{c}{\lambda_C}$), magnetic charge (${e_{emax}}^2$) for measurements, distinguishing dynamic (processes) and substrate (medium capacity) units (Quantum Measurement Units, 2025).

Conductance in QMU:

- Defined as $Cd = \frac{{e_{emax}}^2}{m_e \cdot {\lambda_C}^2 \cdot F_q}$, where Cd is the abbreviated form of $cond$, and is reciprocal to magnetic flux ($mflx$), unlike SI's $G = \frac{1}{R}$ (Quantum Measurement Units, 2025).

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- Conversion: $1\,cond = 2.112 \times 10^{-4} siemens$, enabling SI compatibility.
- In biology, Cd acts as a mind-matter interface, with measurable electrical conductance (matter) and sensory/hormonal perception (space) (Biological Mechanics, Intro).

3. BioAetherdynamics and the Conductance Meter

BioAetherdynamics applies QMU to quantify biological processes, with conductance as the cornerstone.

3.1 QMU in Biology

- **Base Units**: m_e ($9.109 \times 10^{-31} kg$), λ_C ($2.426 \times 10^{-12} m$), F_q ($1.236 \times 10^{20} Hz$), ${e_{emax}}^2$ ($1.400 \times 10^{-37} coul^2$).
- **Conductance (Cd)**: $Cd = \frac{{e_{emax}}^2}{m_e \cdot \lambda_C^2 \cdot F_q} = 2.112 \times 10^{-4} \frac{coul^2 \cdot sec}{kg \cdot m^2}$ measuring magnetic charge per angular momentum.
- **Key Equation**: $capc \cdot freq = Cd$, where cellular capacitance ($capc$, from lipid membranes) and daily frequency cycles ($freq$) drive conductance, essential for metabolism (Biological Mechanics, Equations).

3.2 Conductance as Mind-Matter Interface

- **Dual Nature**: Cd enables electrical currents (matter, e.g., ionic pathways) and sensory perception (space, e.g., hormonal responses via biophotons).
- **Biophoton Link**: $ligt \cdot Cd = accl \cdot chrg$ (light × conductance = accelerating charge) Cd's space aspect may enhance detection of hormonal stress markers, measurable via conductance changes. (Biological Mechanics, Equations).

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3.3 Technical Design

- **Hardware**:

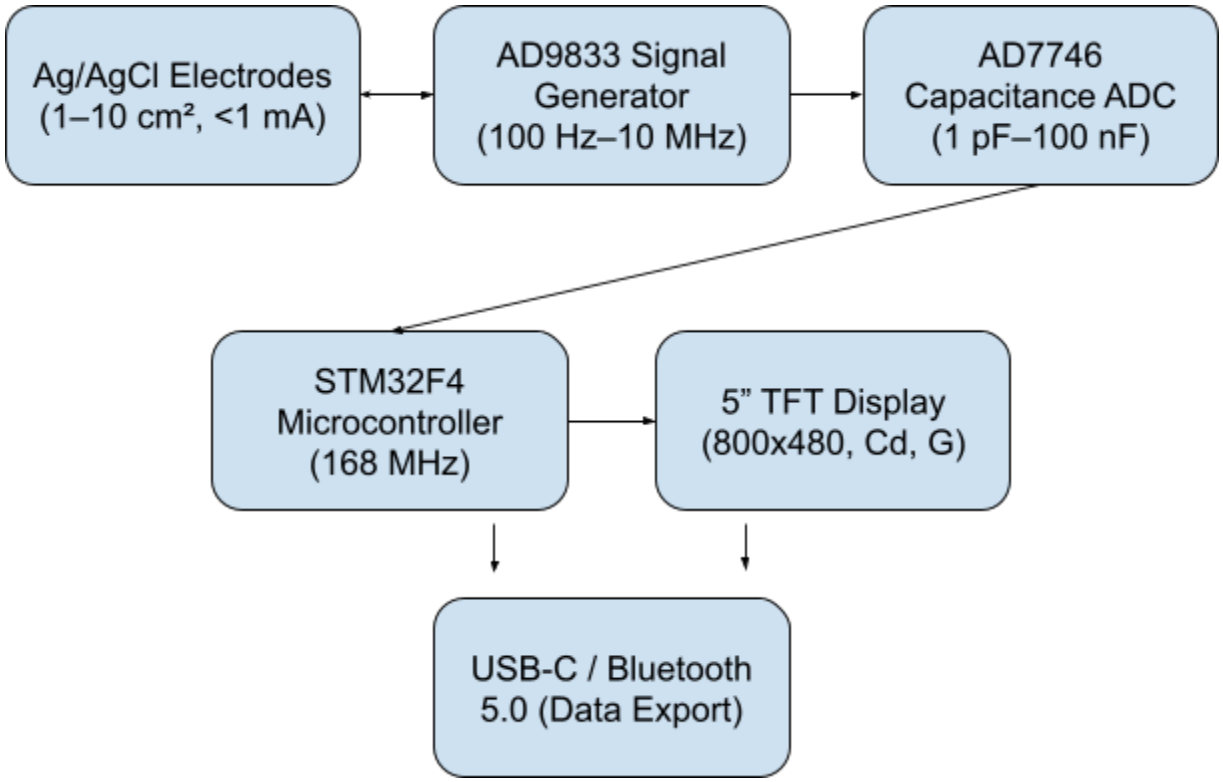

Figure 1 illustrates the meter's hardware, showing signal flow from electrodes (biological input) through the signal generator (100 Hz–10 MHz), capacitance ADC (1 pF–100 nF), microcontroller (computes (Cd_{QMU}), to the display (Cd, G, capacitance, frequency) and data export (USB-C, Bluetooth).

  - **Electrodes**: Ag/AgCl, 1–10 cm², non-invasive, <1 mA (IEC 60601-1 compliant).
  - **Signal Generator**: AD9833, 100 Hz–10 MHz, 100 µA–1 mA.
  - **Capacitance ADC**: AD7746, 24-bit, 1 pF–100 nF.
  - **Microcontroller**: STM32F4 (ARM Cortex-M4, 168 MHz), computes $Cd_{QMU} = capc_{QMU} \cdot freq_{QMU}$.
  - **Display**: 5” TFT, 800×480, showing Cd ($cond$), G ($siemens$), capacitance, frequency.
  - **Connectivity**: USB-C, Bluetooth 5.0 for data export.

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- **Measurement**:
  - Range: Capacitance 1 pF–100 nF, frequency 100 Hz–10 MHz.
  - Accuracy: ±1% capacitance, ±0.1% frequency, ±2% conductance.
  - Conversion: $capc_{QMU} = 1.710 \times 10^{-24} F_{SI}$, $cond_{QMU} = 2.112 \times 10^{-4} S_{SI}$.
- **Calibration**: NIST-traceable capacitors (1 pF–100 nF), 10 MHz crystal, validated against SI conductance via resistors (1 kΩ–1 MΩ).

3.4 Clinical Applications

- **Edema Detection**: QMU's sensitivity to ionic currents enhances tissue conductance measurements, improving lymphedema diagnosis over SI-based devices.
- **Neural Function Monitoring**: Cd captures frequency-dependent neural signals, aiding nerve conduction studies.
- **Stress Assessment**: Conductance reflects hormonal influences, enabling wearable stress monitors, and may correspond to cortisol-related conductance shifts.
- **Biophoton Diagnostics**: $ligt \cdot Cd$ equation suggests biophoton detection for metabolic activity, complementing ImpediMed's impedance analysis.

4. Critical Test and Validation

To validate QMU's superiority, QADI proposes a critical test:

- **Protocol**:
  - **Parameters**: 100 Hz–10 MHz, materials (copper, saline, skin, neural tissue), conditions (10–40°C, 20–80% RH).
  - **Setup**: Measure C_SI, f_SI with meter, compute $Cd_{QMU} = capc_{QMU} \cdot freq_{QMU}$, $G_{SI} = C_{SI} \cdot f_{SI}$. Compare with $G_{SIref} = \frac{1}{R}$ from Keysight E4980A LCR meter.
  - **Partners**: UIUC's IQUIST, Fermilab labs.
- **Metrics**: Cd_{QMU} error <2% vs. G_{SIref} <5%, wider linearity across frequencies/materials.

ImpediMed's direct testing, potentially supported by IQMP's shared facilities (e.g., Quantum Proving Ground) and UIUC/Fermilab partnerships, ensures real-time access to results, streamlining validation while QADI operates from Alma, Illinois. Unlike ImpediMed's SFB7 (100 Hz–1 MHz, ~5% error), the QMU meter's 100 Hz–10 MHz range and <2% error offer superior sensitivity for neural and stress applications.

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- **Pilot Study**: Small-scale test with ImpediMed's SFB7 (saline, 1 kHz–1 MHz) to predict Cd_{QMU} values, reducing risk. Pilot study planned for Q4 2025 using ImpediMed's SFB7.
- **SI Compatibility**: Dual QMU/SI outputs ensure marketability, with NIST-traceable validation.
- **Timeline**: Q2 2026, results published in peer-reviewed journals (e.g., Journal of Medical Devices.

5. Commercial and Regulatory Pathway

- **Market**:
  - **Size**: $1B bioimpedance, $50B wearables.
  - **Revenue**: $5M in 3 years (1,000 research units at $5,000, 5,000 consumer at $500).
- **Costs**:
  - **Prototyping**: $30,000 for hardware, $20,000–$70,000 for testing and firmware. (R&D, components).
  - **Production**: $100–$150/unit components, $50/unit assembly.
- **Regulatory**:
  - **FDA**: Class II 510(k) clearance, 12–18 months from Q1 2026, leveraging bioimpedance predicates.
  - **Standards**: IEC 60601-1 (<1 mA), ISO 13485, FCC Part 15, CE Mark.
- **IP**: Provisional patent for QMU algorithm, co-owned, filed via VISTA ($500).
- **Funding**: QADI, from its Alma, Illinois base, plans VISTA/INVENT applications in Q3 2025, with DOE QIS and SBIR/STTR by Q4 2025, potentially through IQMP's On-Ramp program to access Illinois' quantum ecosystem resources.
  - **VISTA**: $500K–$1M for prototyping.
  - **INVENT**: $100K–$200K equity.
  - **DOE QIS**: $200K–$500K.
  - **SBIR/STTR**: $50K–$75K, ImpediMed co-applicant.

6. Conclusion

The BioAetherDynamics Conductance Meter offers ImpediMed a transformative opportunity to advance bioimpedance technology, leveraging QMU's novel conductance model. While APM requires experimental validation, its 18 foundational papers provide a compelling theoretical basis, accessible at quantumaetherdynamics.org/#research. The meter's technical design

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integrates with ImpediMed's expertise, targeting high-value clinical applications with robust commercial potential. Supported by Illinois' quantum ecosystem and QADI's collaboration with UIUC, the project mitigates risk through pilot studies and funding. QADI invites ImpediMed to partner and co-develop a device that could enhance diagnostics and explore a new physics paradigm. Contact David W. Thomson at aetherwizard@gmail.com or 618-359-2486.

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- [See quantumaetherdynamics.org/#research for all 18 papers]

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