# FSME LOGIC

## ENGINE CREDIBILITY REFERENCE

*For technical and engineering audiences | Patent Pending CA 3,297,487*

## WHAT THE ENGINE IS BUILT ON

FSME Logic's detection engine is built on a specific physical principle: real systems are not memoryless. The signals produced by machinery, aerospace hardware, and industrial equipment carry causal history — the present state of a system reflects what happened to it recently. Standard monitoring systems discard that history by design. FSME reads it.

This approach is grounded in non-Markovian causal state-space physics — a well-established and actively researched area of physics that describes how systems retain memory of their recent past. The mathematical framework underpinning FSME has been independently validated by multiple major research institutions, none of whom are affiliated with this work and none of whom were aware of each other's findings.

## INDEPENDENT ACADEMIC CONVERGENCE

The following institutions have each independently confirmed, from completely separate experimental directions, the same class of physics that FSME operates on. These are citable, peer-reviewed sources.

### Google Quantum AI — Nature, October 2025

Using a large-scale superconducting quantum processor, Google demonstrated that physical systems retain sensitivity to past dynamics through constructive interference even after information appears fully scrambled. They identified a precise boundary — the edge of quantum ergodicity — where standard Markovian assumptions fail and causal memory becomes the dominant physical effect.

**Convergence with FSME:** FSME operates at the classical macroscopic equivalent of this boundary. Where Google confirmed the mechanism in quantum circuits, FSME applies the same principle to classical industrial sensor signals.

### Brookhaven National Laboratory — Nature, February 2026

Using the Relativistic Heavy Ion Collider, Brookhaven confirmed that physical systems emerging from the quantum vacuum retain memory of their prior state before they become detectable matter. Causal history is not erased — it is carried forward into physical reality at a foundational level.

**Convergence with FSME:** This is experimental confirmation that non-Markovian causal structure is a physical property of matter itself, not an abstraction. Physical systems inherit the memory of what produced them.

### Weizmann Institute of Science — Nature, January 2026

Dr. Yuval Ronen's laboratory demonstrated that quantum systems store information about the order of past interactions in a topologically protected way. The system literally remembers what happened to it — and that memory is encoded in structure rather than destroyed by subsequent events.

**Convergence with FSME:** Topological memory is the quantum-scale mechanism for the same long-range temporal persistence FSME detects at the classical macroscopic scale in industrial sensor data.

**Dr. Laura Mersini-Houghton, UNC Chapel Hill — arXiv, April 2025**

Mersini-Houghton demonstrated mathematically that the quantum vacuum behaves as a time crystal fluid — a structure that retains periodic temporal memory and resists entropic perturbation. Her work predicts specific phase transition behavior when the substrate is stressed beyond a saturation threshold.

**Convergence with FSME:** Her theoretical predictions about vacuum saturation behavior are consistent with results from the hardware experiments that preceded FSME's commercial validation dataset.

**Costa & Yang — arXiv, December 2025**

Costa and Yang developed a rigorous continuous-time mathematical framework proving that non-Markovian behavior can be characterized functionally from observable signals alone — without requiring knowledge of the underlying microscopic physics. The causal memory of a system is readable from the outside.

**Convergence with FSME:** This is the formal mathematical justification for why FSME produces consistent results across domains as different as jet engine telemetry, orbital satellite data, and industrial bearing vibration — the same causal memory principle operates regardless of the physical domain.

## PRIORITY OF THEORY OVER DATA

The detection framework underlying FSME was formalized and filed as a provisional patent application on December 17, 2025 (Canadian Patent Application CA 3,297,487). The commercial validation results — NASA Mars Science Laboratory, ESA OPS-SAT orbital data, CWRU bearing fault detection, commercial refrigeration — were produced after that filing date. The theory preceded the measurement. The parameters were not retrofitted to data.

***Standard monitoring assumes the universe has amnesia.***

***Five independent research institutions say it does not.***

***FSME reads the memory.***