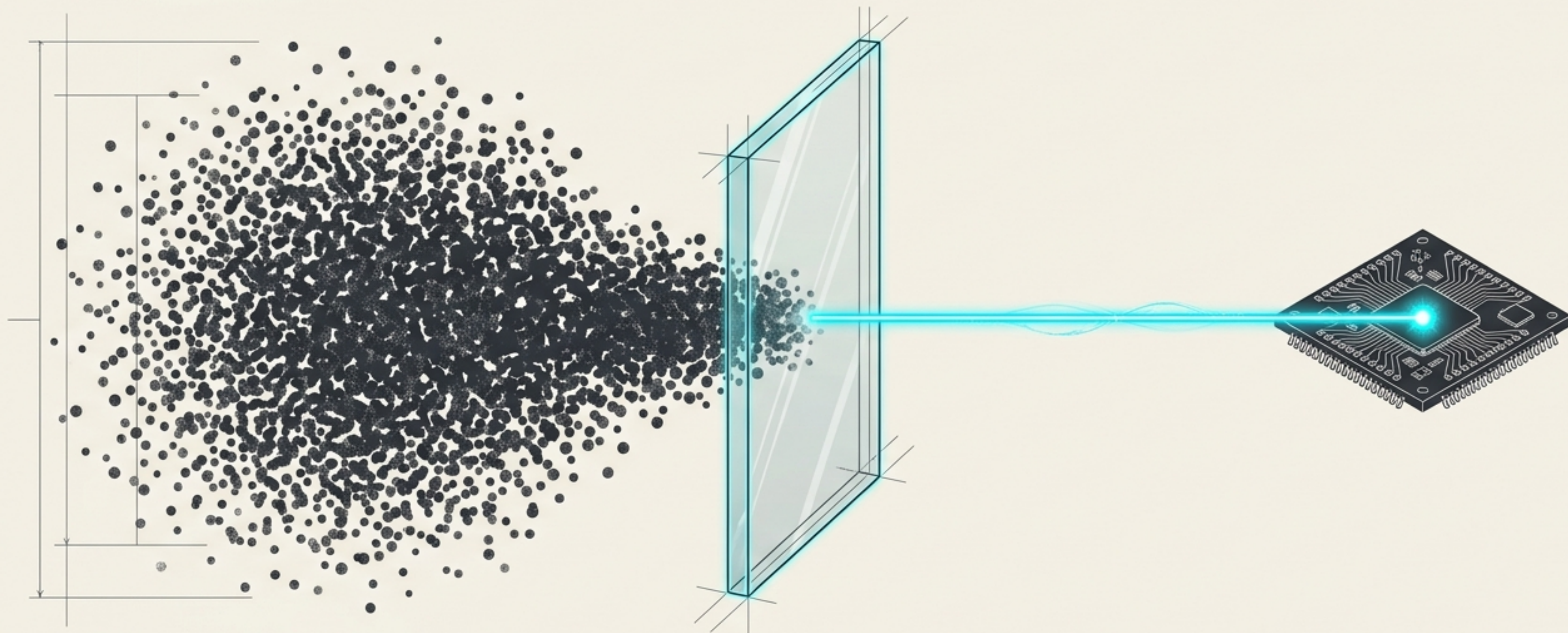


THE CAMERA THAT CAPTURES THE ANSWER, NOT THE PICTURE

An introduction to PhotonLayer: the deterministic optical-AI front end.



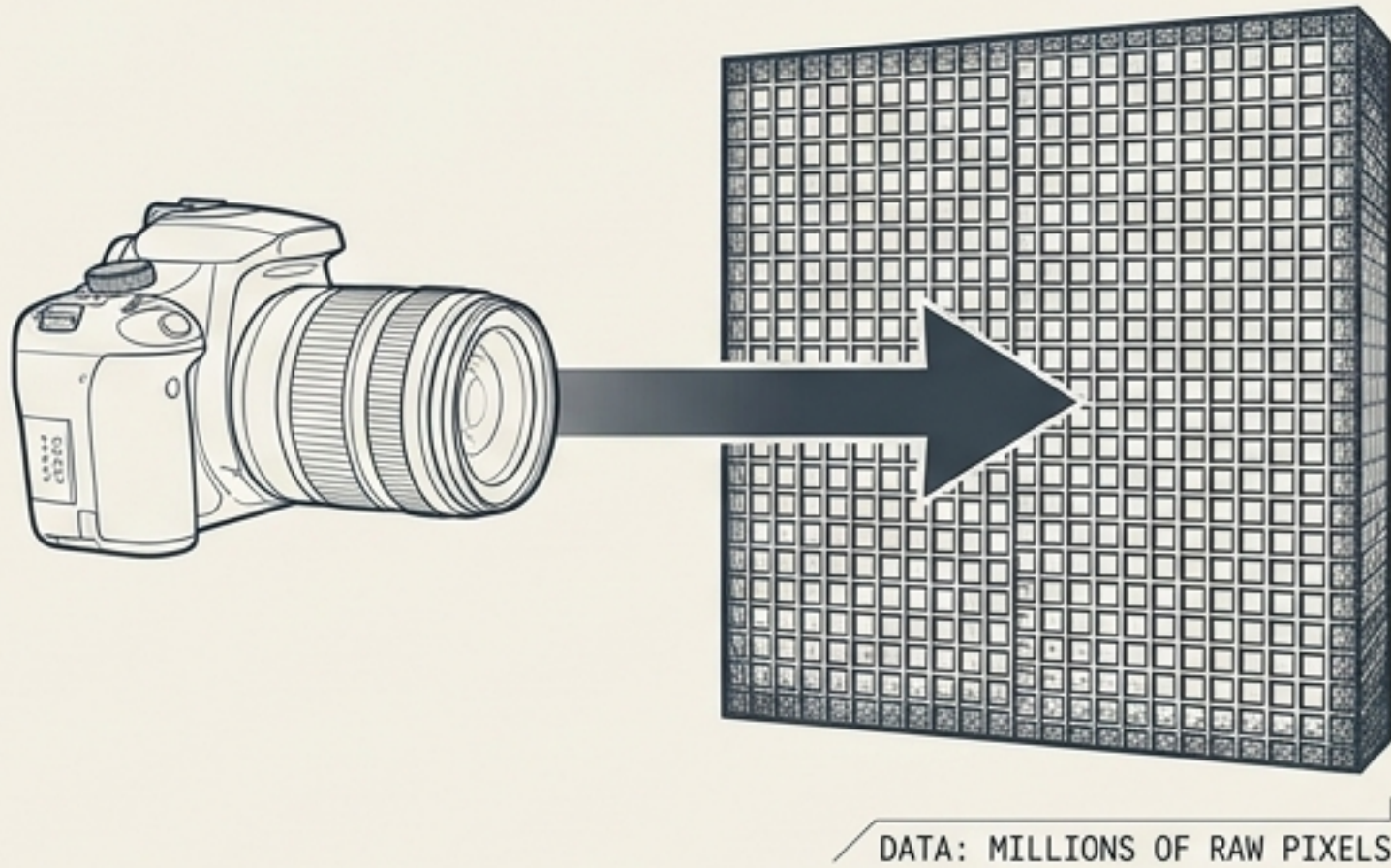
RAW DATA INPUT (UNSTRUCTURED CHAOS) ::
10¹⁵ PHOTONS/SEC

PHOTONLAYER PHASE MASK ::
DETERMINISTIC OPTICAL PROCESSING

FOCUSED INSIGHT BEAM ::
OPTICAL AI OUTPUT

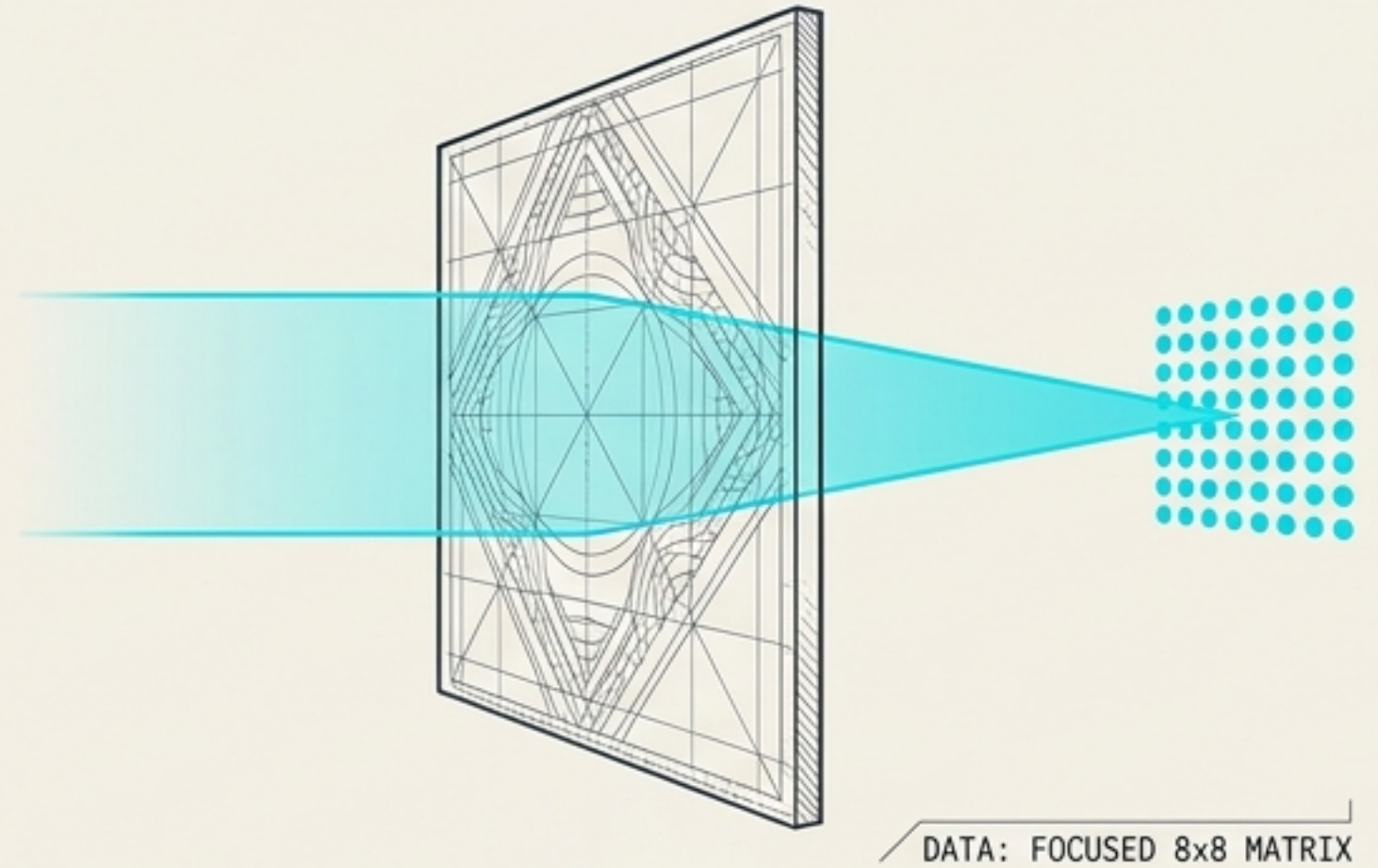
NEURAL CORE (ANSWER EXTRACTION) ::
SINGLE-SHOT INFERENCE

The Old Way



Cameras record every detail. Computers must read every pixel just to figure out what it is looking at.

The PhotonLayer Way



PhotonLayer puts “smart glass” in front of a tiny sensor. The glass bends the light so it only captures the useful information—a few numbers.

PhotonLayer is a deterministic optical-AI front end. It reshapes light before it hits the sensor, squeezing the answer out of the physics so the digital computer barely has to work.

SYSTEM: DETERMINISTIC OPTICAL PROCESSING; EFFICIENCY: MAXIMUM

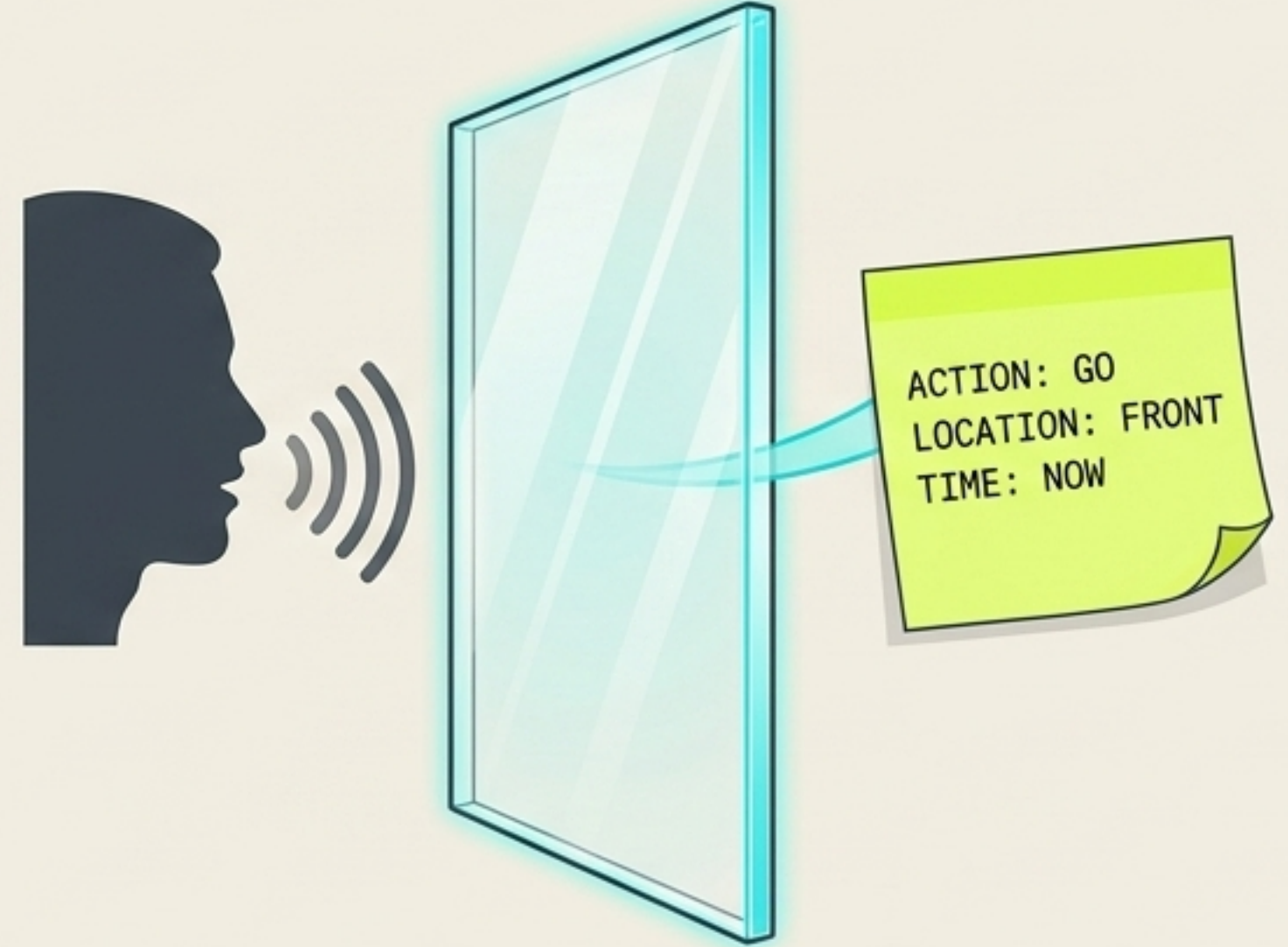
The Translator Metaphor: Summary vs. Transcript

A The Traditional Camera



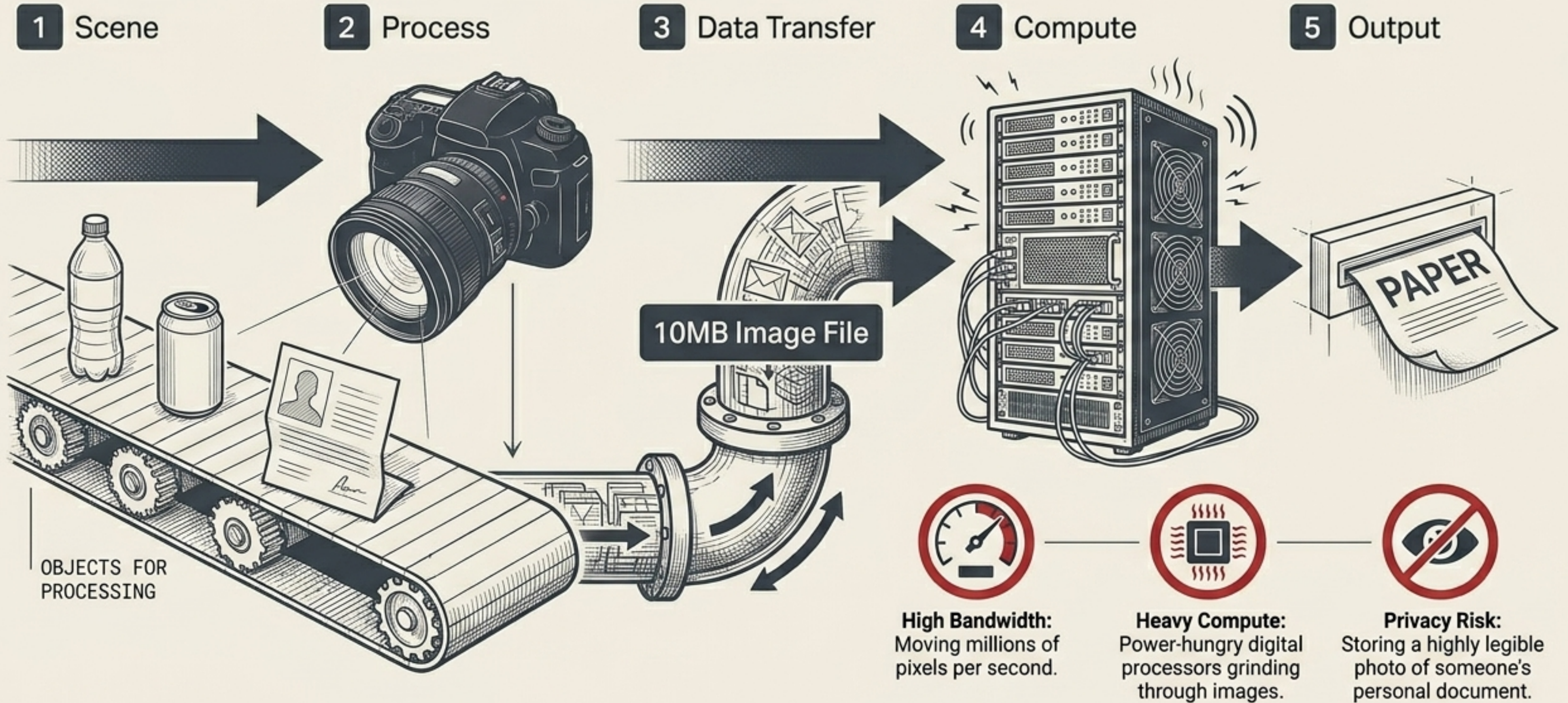
Captures the entire, word-for-word transcript. You have to read the whole stack to decide what to do.

B PhotonLayer

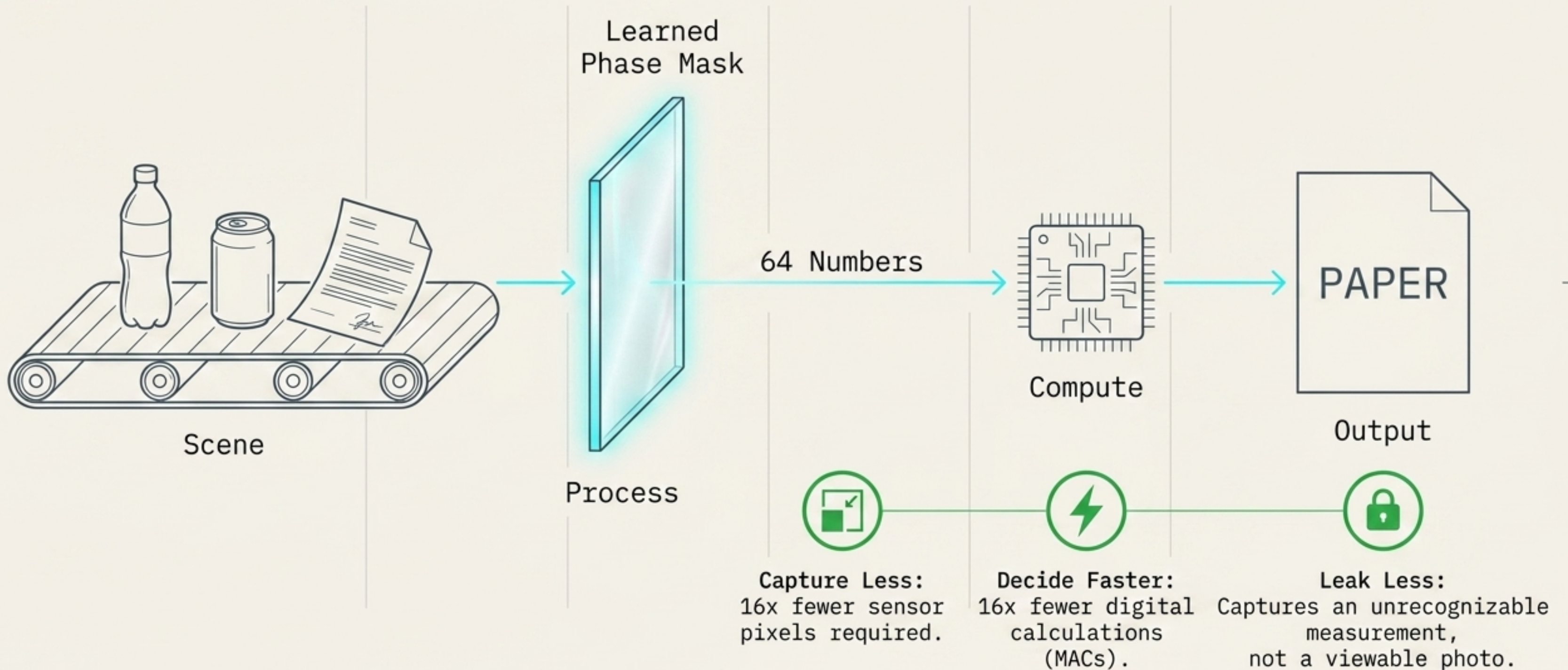


A translator listens to the speech and hands you a one-line summary. You never needed the full transcript to act.

The Tax of Capturing Everything



Deciding in the Light



The Anatomy of a Physical Paradigm Shift

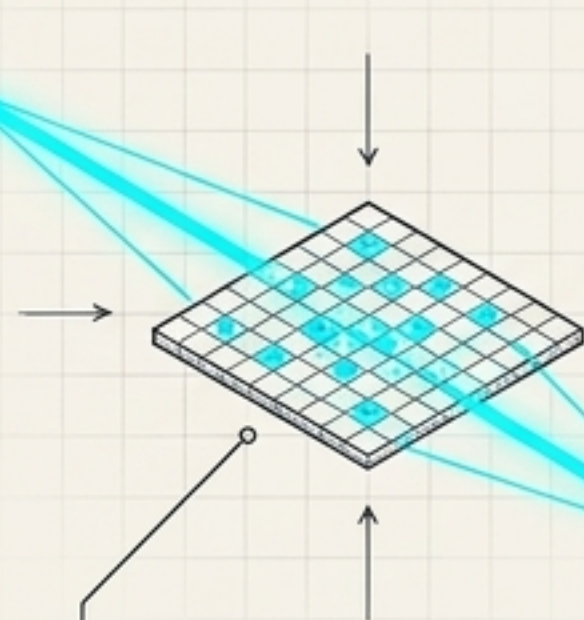
PART 1 The Phase Mask (Smart Glass)



A flat optical surface patterned to nudge light waves so they arrive slightly early or late. This pattern is learned for a specific task.

OPTICAL PATH MODULATION /
LEARNED DIFFRACTIVE ELEMENT

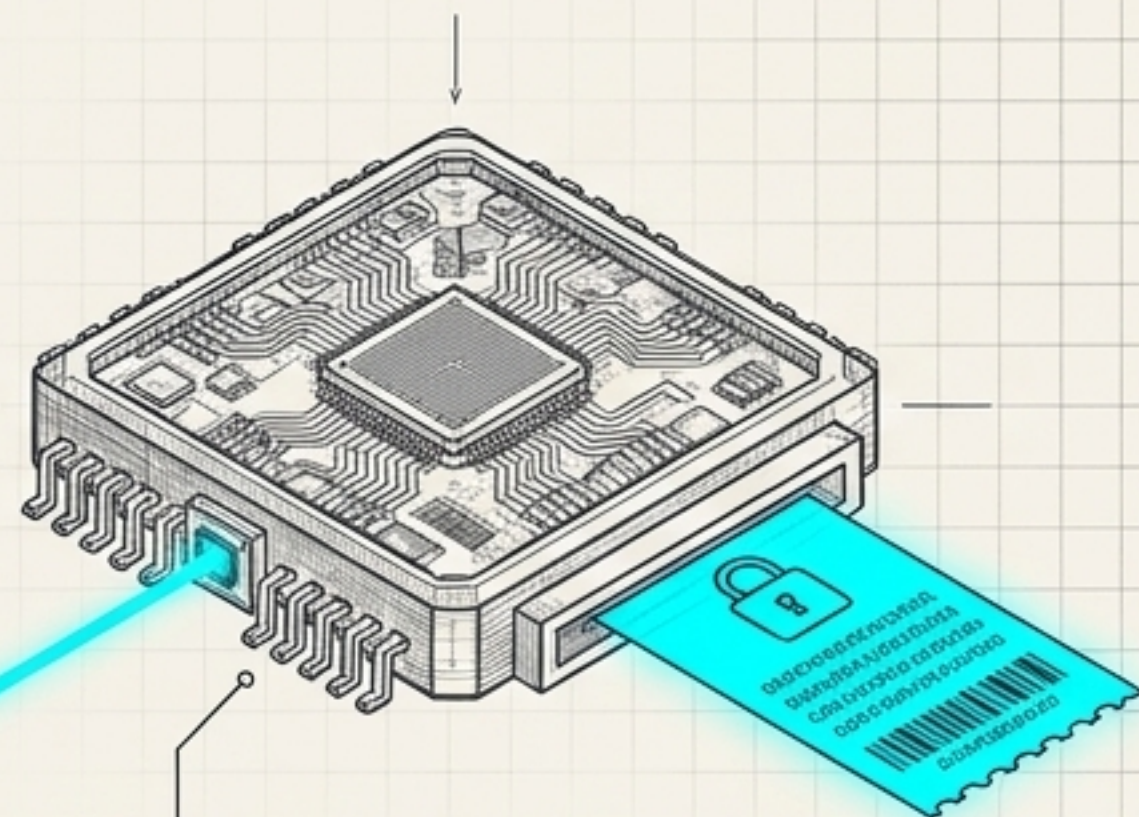
PART 2 The Sensor (The 64-Number Summary)



Because the glass did the 'thinking', this tiny grid only captures the compressed answer, not the image.

8x8 PIXEL ARRAY /
DIRECT INFORMATION CAPTURE

PART 3 The Decoder & Receipt (The Trust Layer)



A tiny program reads the numbers, and generates a tamper-evident BLAKE3 hash proving exactly what was measured.

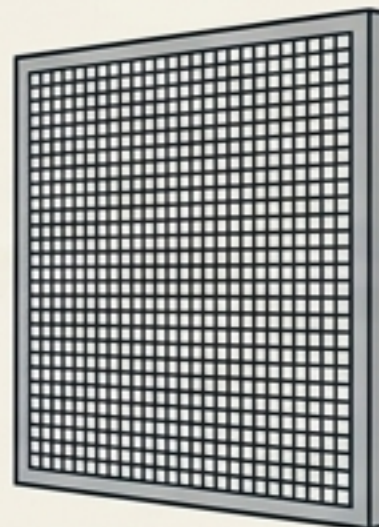
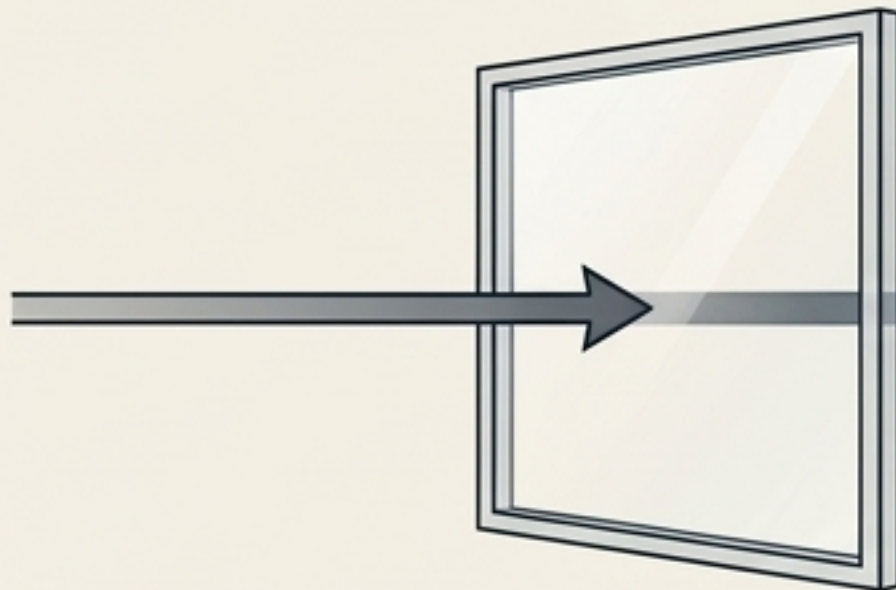
CRYPTOGRAPHIC HASH GENERATION /
VERIFIABLE MEASUREMENT PROOF / BLAKE3

Two Paradigms for Machine Vision

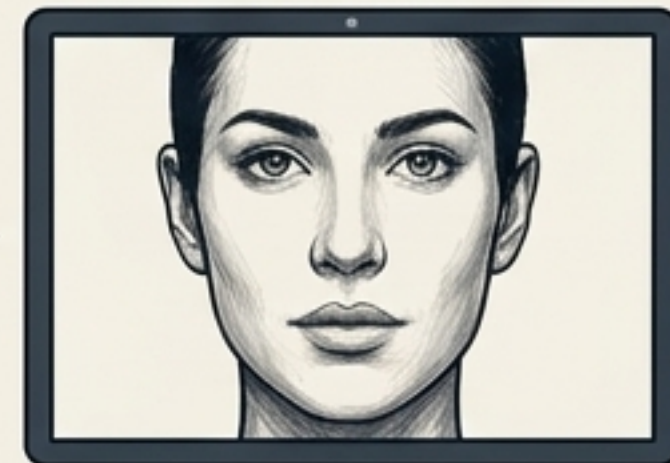
Dimension	Traditional AI Camera	PhotonLayer
What it Captures	Everything (Millions of pixels)	The Answer (A few numbers)
Where the "Thinking" Happens	Heavy digital servers	In the light itself (via smart glass)
Energy & Speed	Power-hungry processing	Micro-power (physics is free)
Privacy Risk	High (stores viewable photos)	Built-In (unrecognizable measurement)
Trust Model	Trust our black-box algorithm	Verify this mathematically signed receipt

Privacy by Physics: Leaking Less by Design

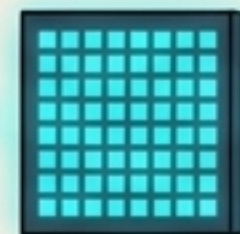
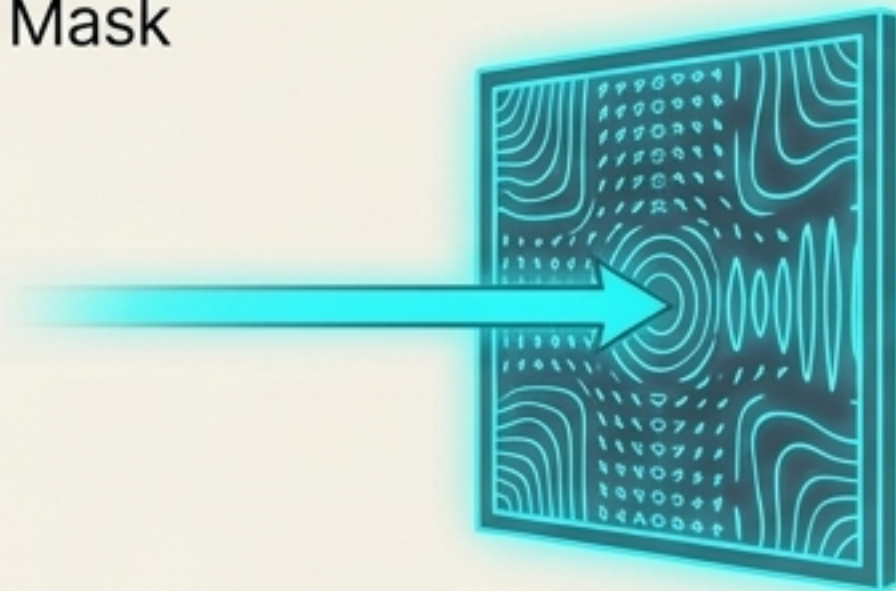
Standard Glass



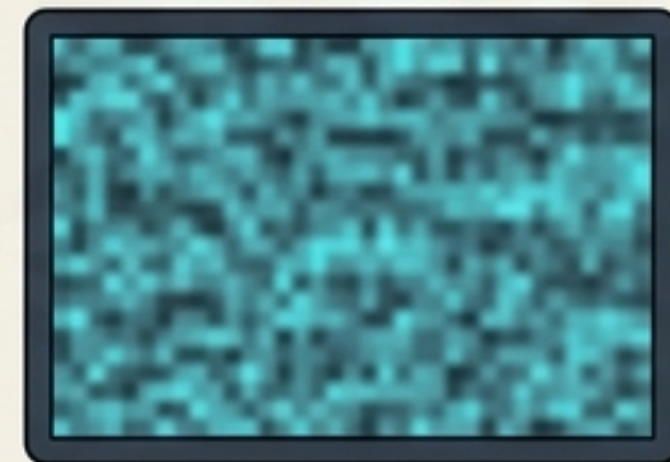
High Leakage



Learned Phase Mask



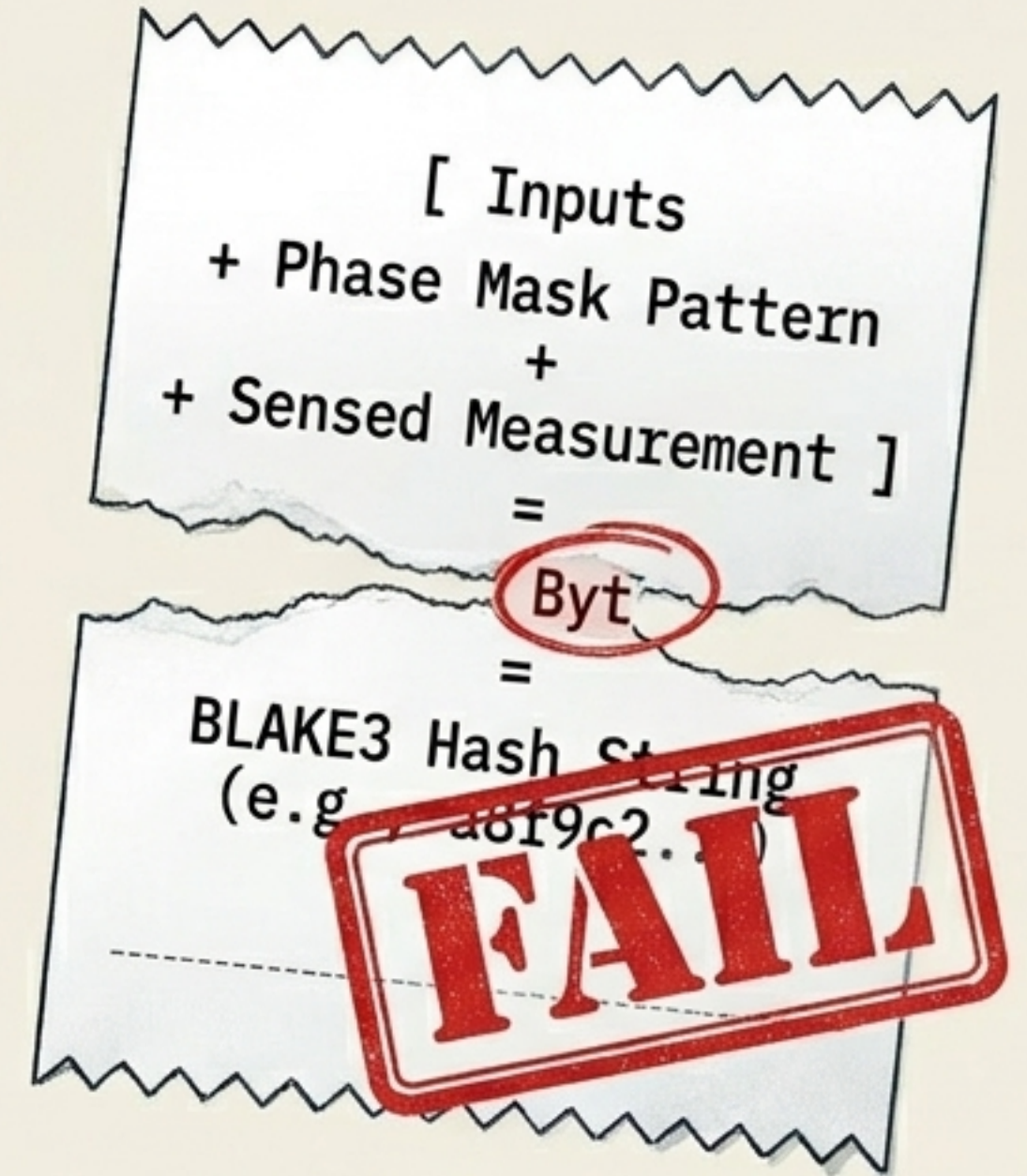
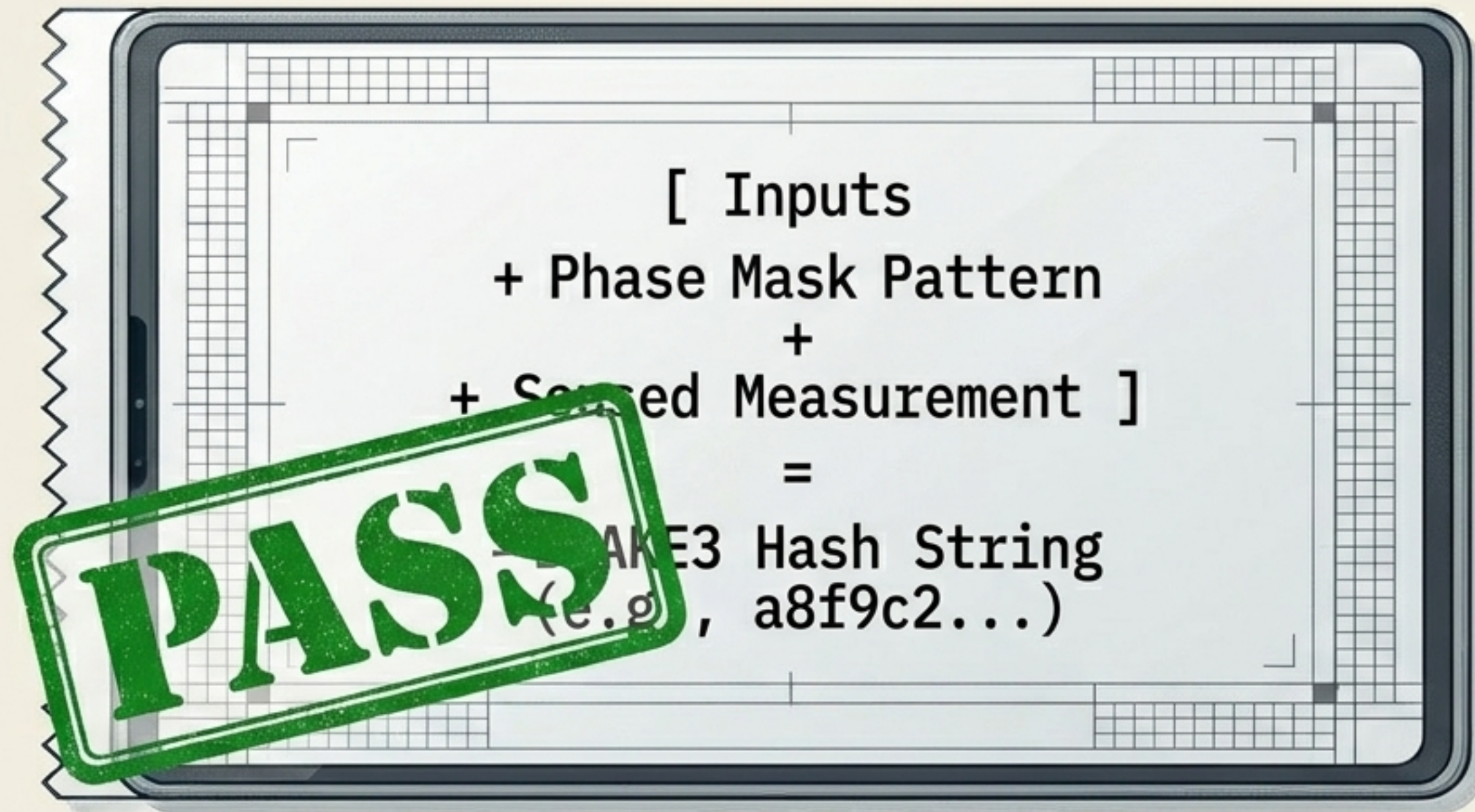
Low Leakage



A normal camera captures the scene. **PhotonLayer** captures a **compressed measurement**. Because the sensor data is shaped to answer a specific question, it is incredibly difficult to reconstruct the original identity from the numbers.

Honest Check: This is a linear privacy probe, not a magical zero-knowledge guarantee. Advanced AI could theoretically reconstruct more, but the physics fundamentally limit what is captured.

Proving What Happened with Deterministic Receipts



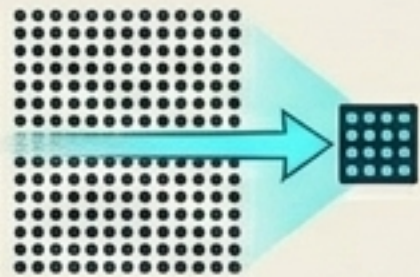
Every run of PhotonLayer emits a **tamper-evident BLAKE3 receipt**. Because the pure Rust simulator is deterministic, a result isn't just a screenshot or a claim—it is a **mathematically reproducible** experiment. If anyone alters the inputs or the measurement, the receipt instantly breaks.

The Reality Check: Honest Scope

What it IS today



- A brilliant software simulator written in pure Rust.



- A proof of "privacy by physics" and single-layer optical compression.



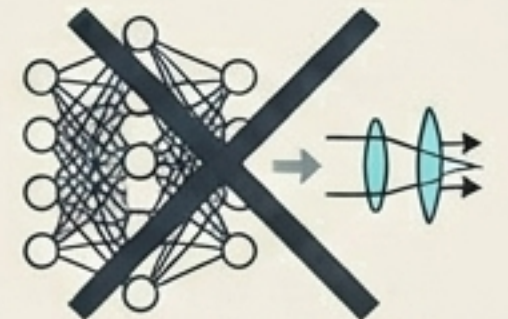
- A system that genuinely separates features better than raw pixels (16x fewer pixels).

What it is NOT

- Physical glass hardware you can buy today (it is a roadmap item).



- A claim that optics beat massive digital neural networks on raw accuracy.

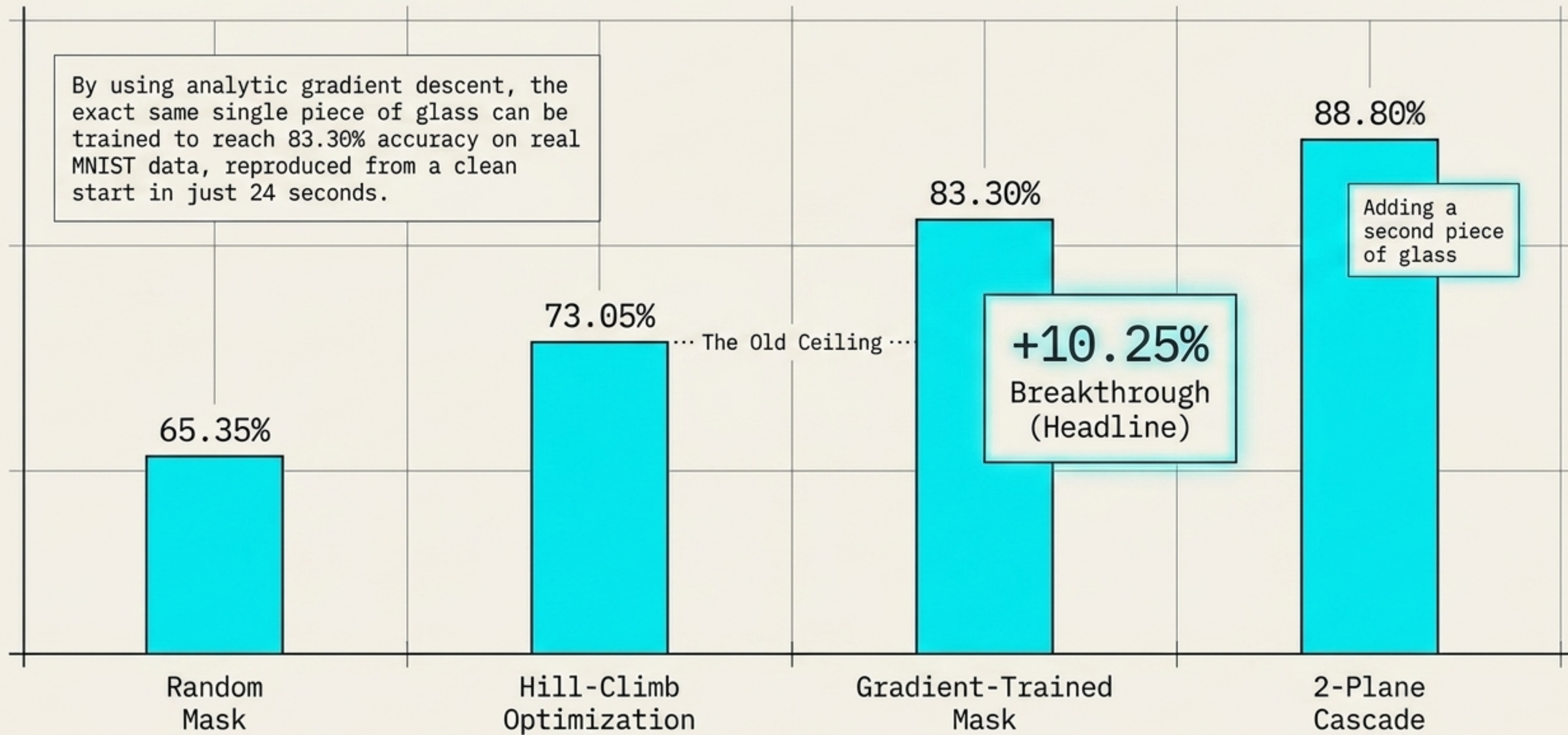


- An impenetrable, zero-knowledge security guarantee against all future attacks.

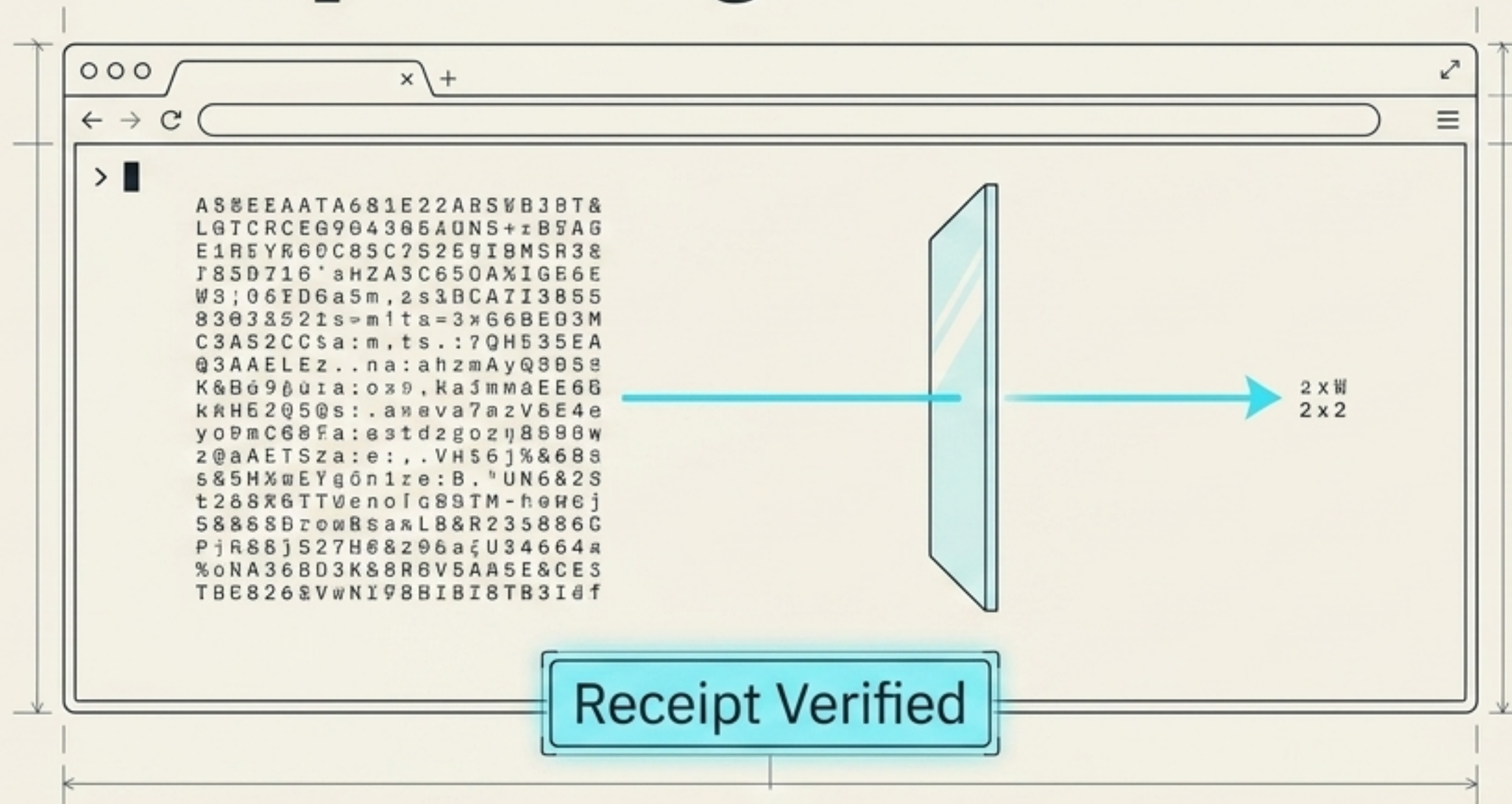


All accuracy figures are based on noise-free scalar-diffraction simulation.
Building the physical lensless camera bridge is next.

Breaking the Optimizer Ceiling (The Measured Results)



See It Squeeze Light in Your Browser



No Install Required

Open the live browser demo right now. Shape light through a learned mask, watch it compress, and verify the receipt yourself.

ruvnet.github.io/PhotonLayer

Run It Locally

Pull the pure Rust crates and run the 30-line deterministic tour offline.

```
cargo run --release --example hello_optics -p photonlayer-core
```