Project Silica

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Sustainable, Cost-effective Storage: An Unmet Need

Magnetic media degrades & susceptible to interference

- Data "refresh" to new media every few years
- Energy required to "scrub" media

Emissions, energy, and cost to store data scale with the lifetime of the data!

Building a New Storage Technology

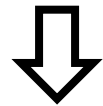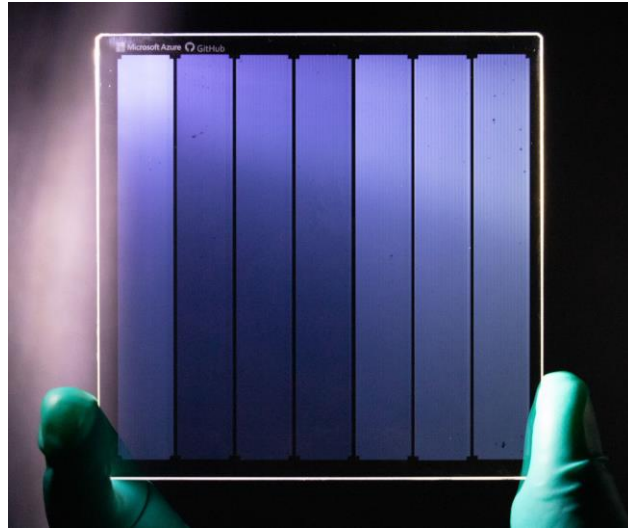✓ 1) Understanding & Taming the Physics

✓ 2) Designing & Prototyping the System

3) Operationalizing the Technology

The Solution: Glass Storage in the Cloud

- Low-cost
- Durable
- EMF-proof
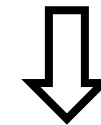- WORM
- Data lifetimes of 10,000+ years

⬇

Truly sustainable media;
data left in situ **forever**

- Scale
- Geo-distribution

⬇

Low-cost + availability

First true "air-gap-by-design"
storage system!

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Writing Data in Glass

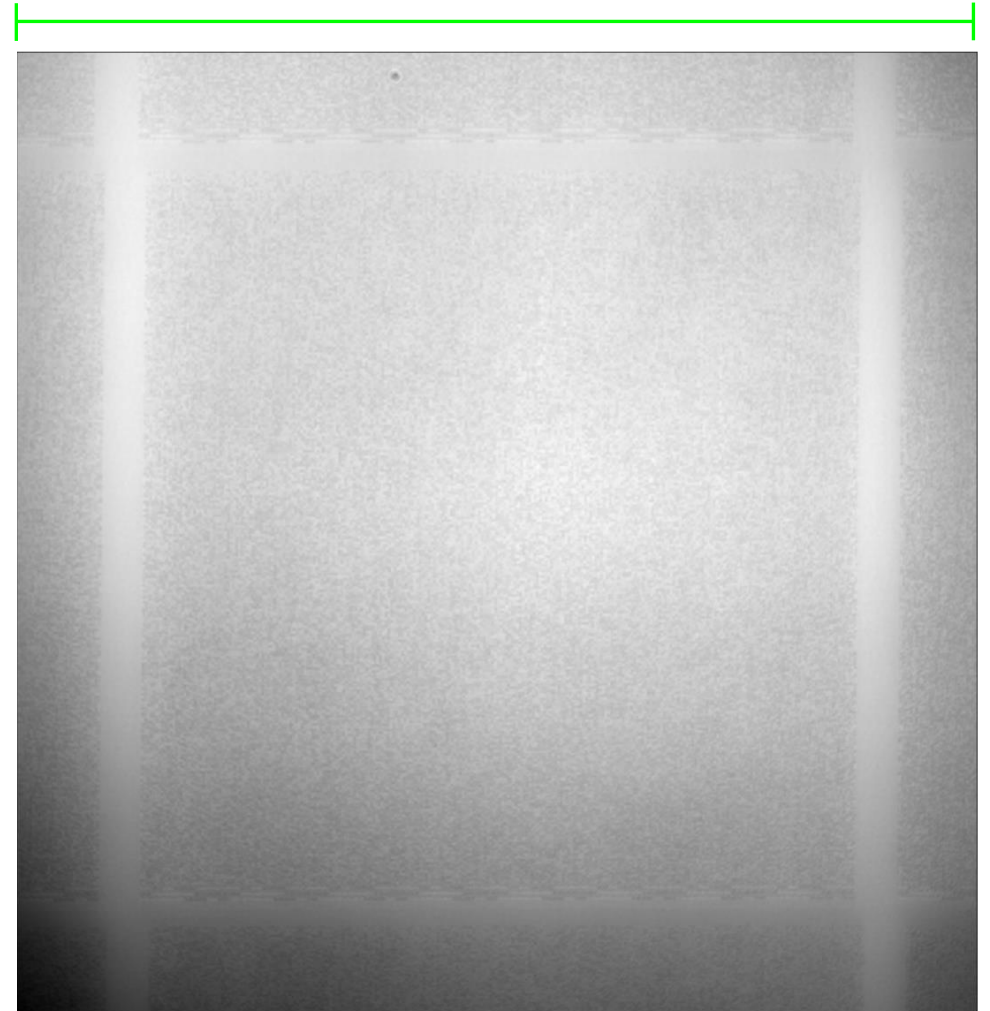Femtosecond ($\sim 10^{-15}$s) pulsed-laser writing

1 μm
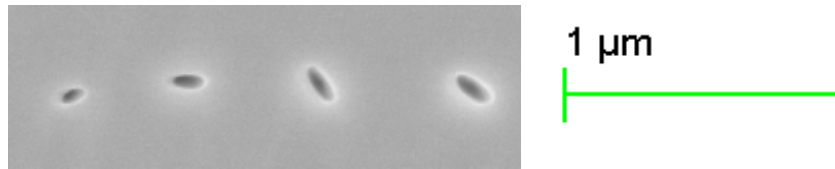
SEM image of 4 "voxels"
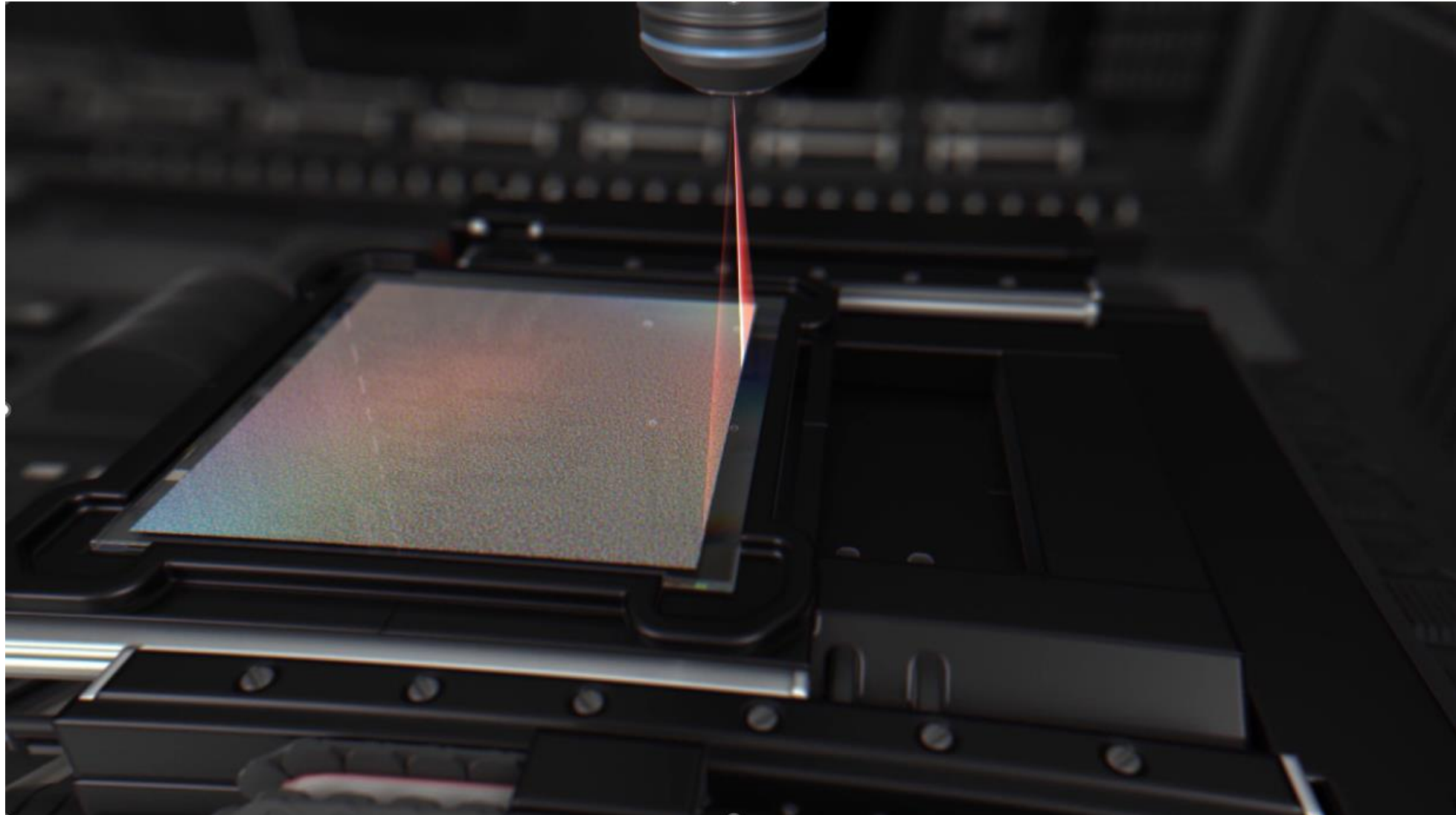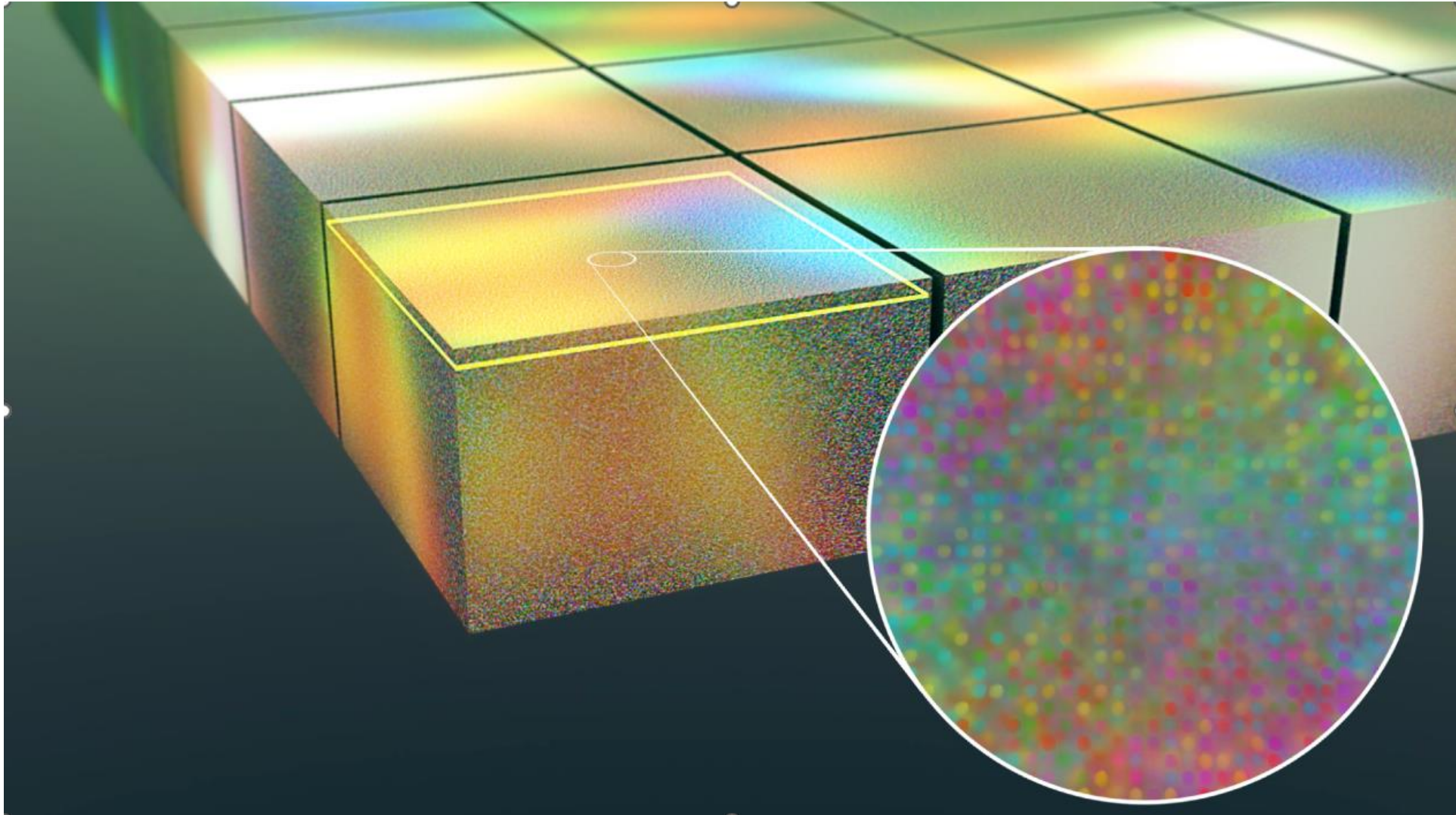
Each "voxel" encodes multiple bits of data

Data sector from prototype hardware
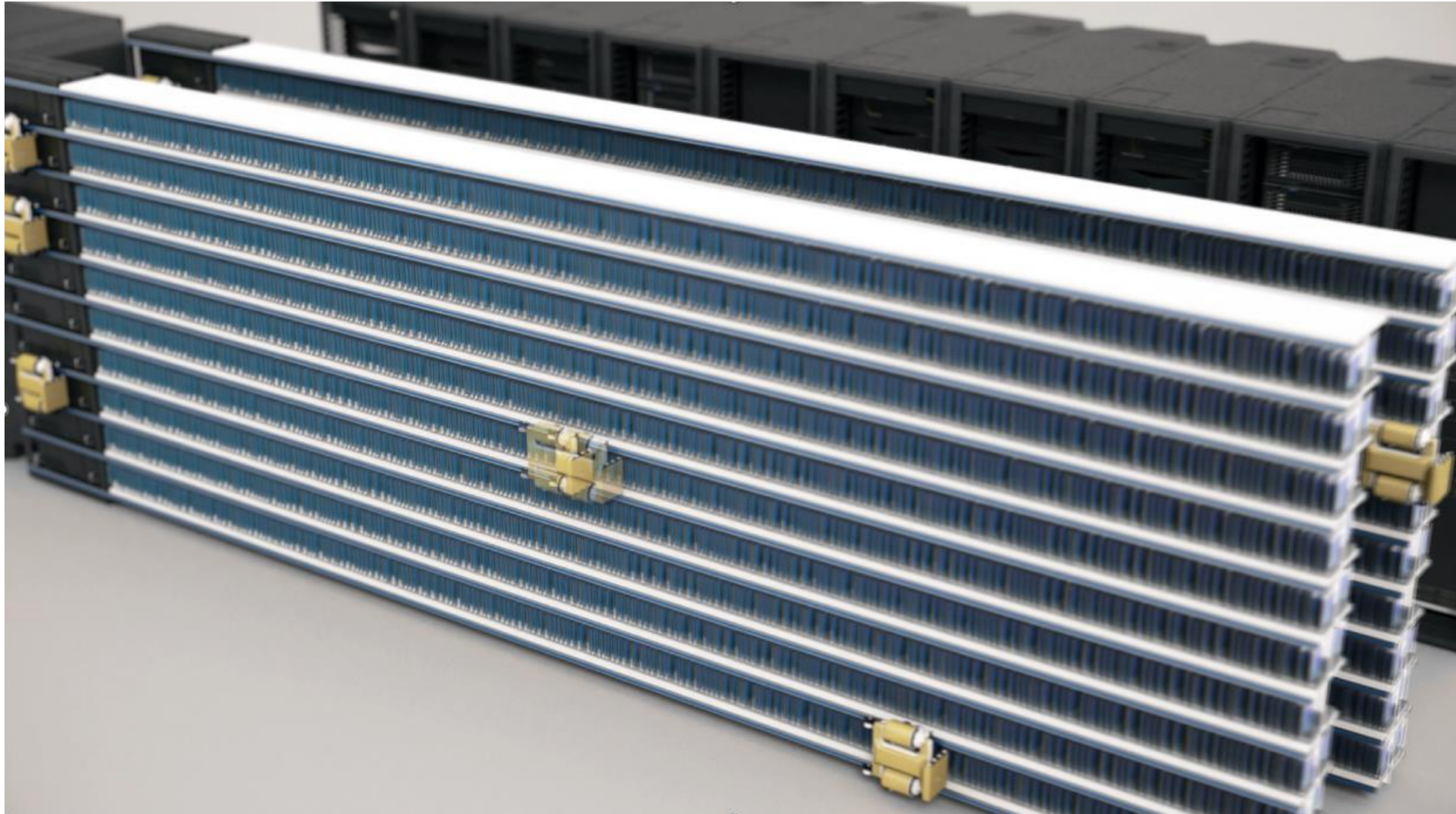
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High-Throughput Writing in Glass
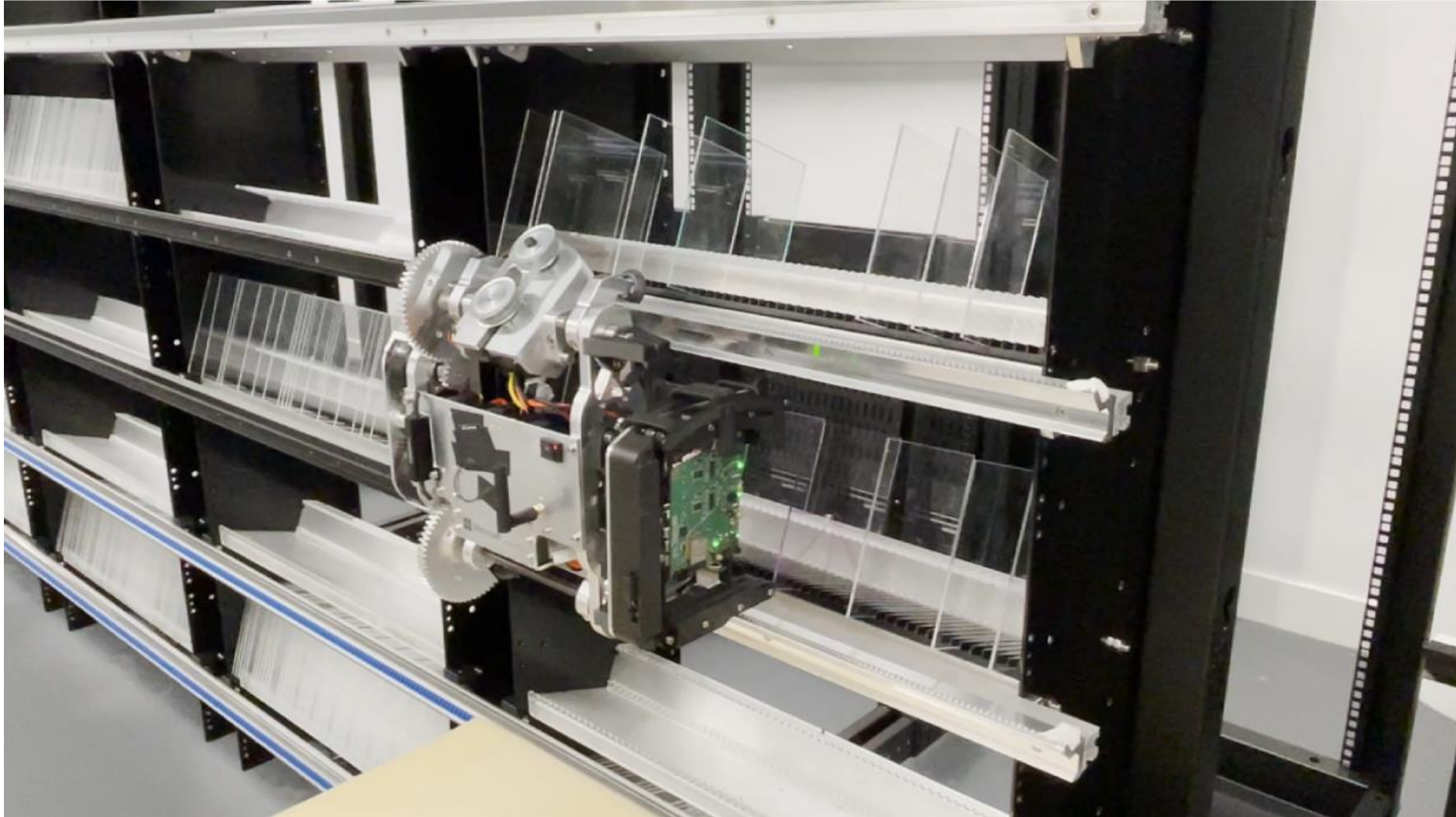
Verifying Data in Glass

Silica Glass Library

Silica Glass Library Prototype!

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Thank you!

- All part of **Cloud Systems Futures** at Microsoft Research Cambridge

- Inventing disruptive technologies:
    - Storage
    - Analog compute
        - Solving optimization problems with light
    - Optical networking
        - Unconventional transceiver designs
        - Lower cost & lower power
    - …and much more!

- Get in touch:
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