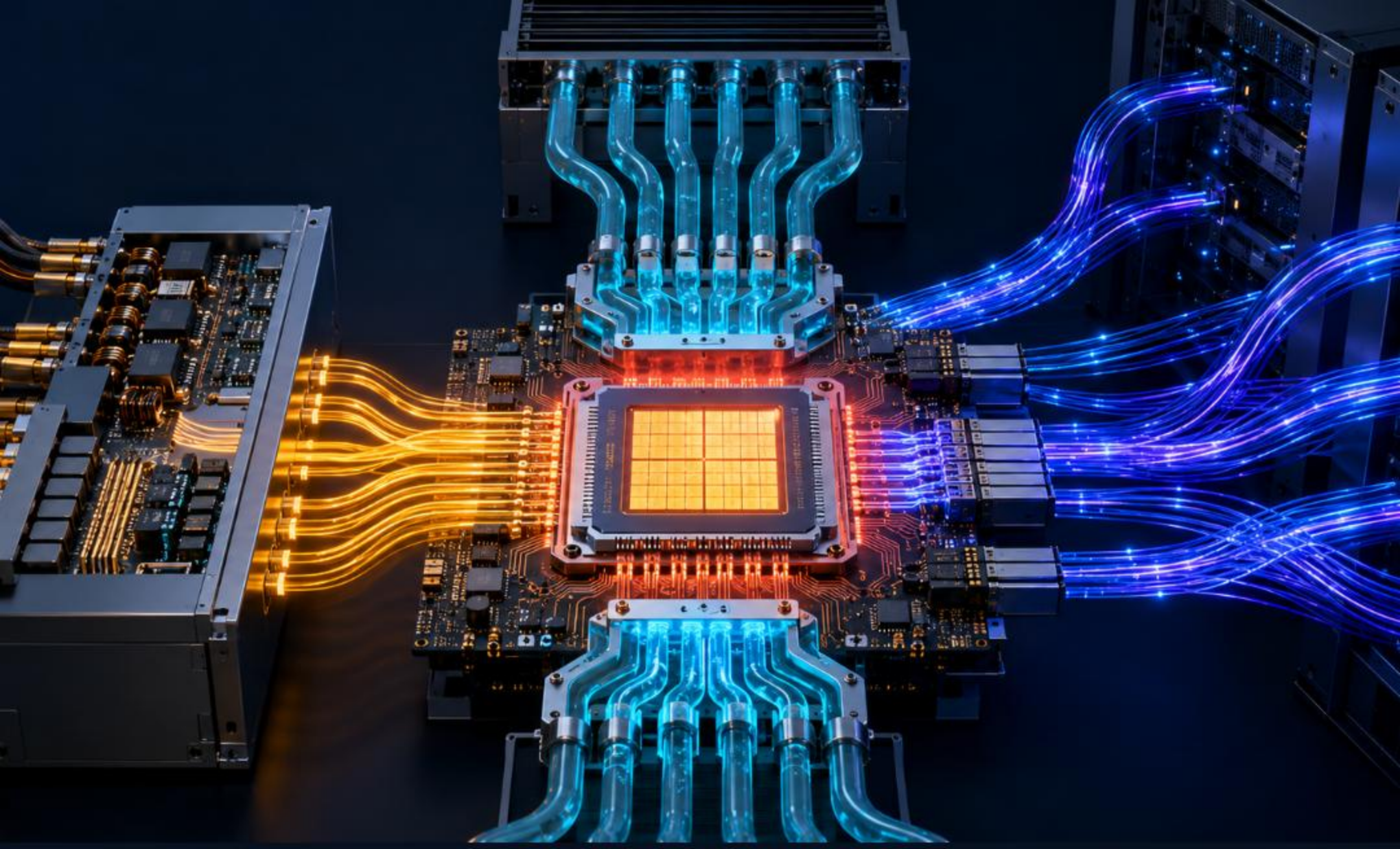


THE PHYSICAL BOTTLENECKS OF

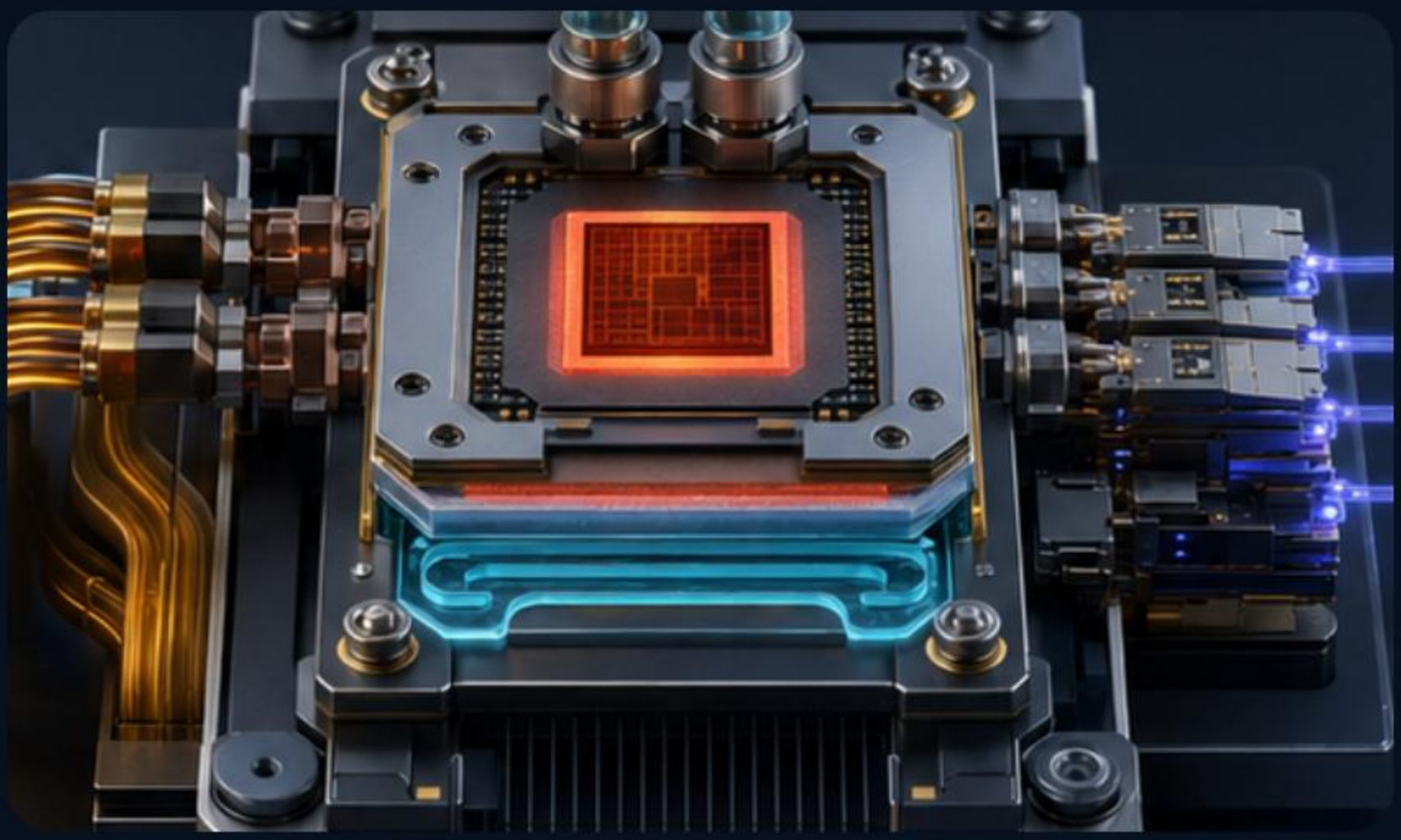
AI INFRASTRUCTURE

Power in | Data through | Heat out

A public thesis from Oyon DeepTech

AI scaling is becoming a physical problem

Compute performance now depends on three coupled physical flows.



POWER IN

Deliver electricity with fewer conversion losses and less copper.

DATA THROUGH

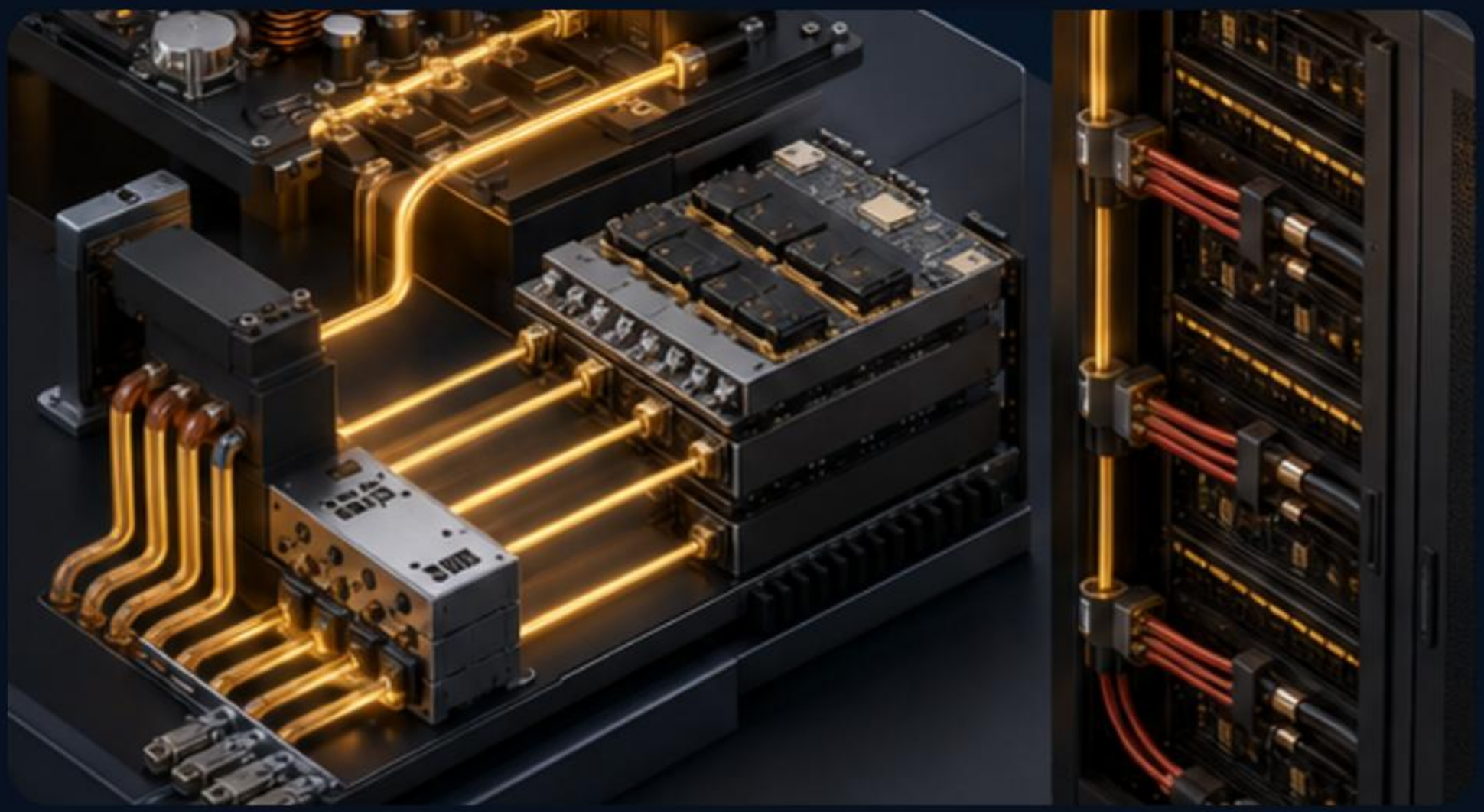
Move bandwidth without letting electrical I/O overwhelm the energy budget.

HEAT OUT

Remove heat across interfaces without sacrificing reliability or yield.

1 - POWER IN

Power delivery is becoming system architecture



WHAT BREAKS

Multiple conversion stages consume efficiency, copper and rack space.

WHAT CHANGES

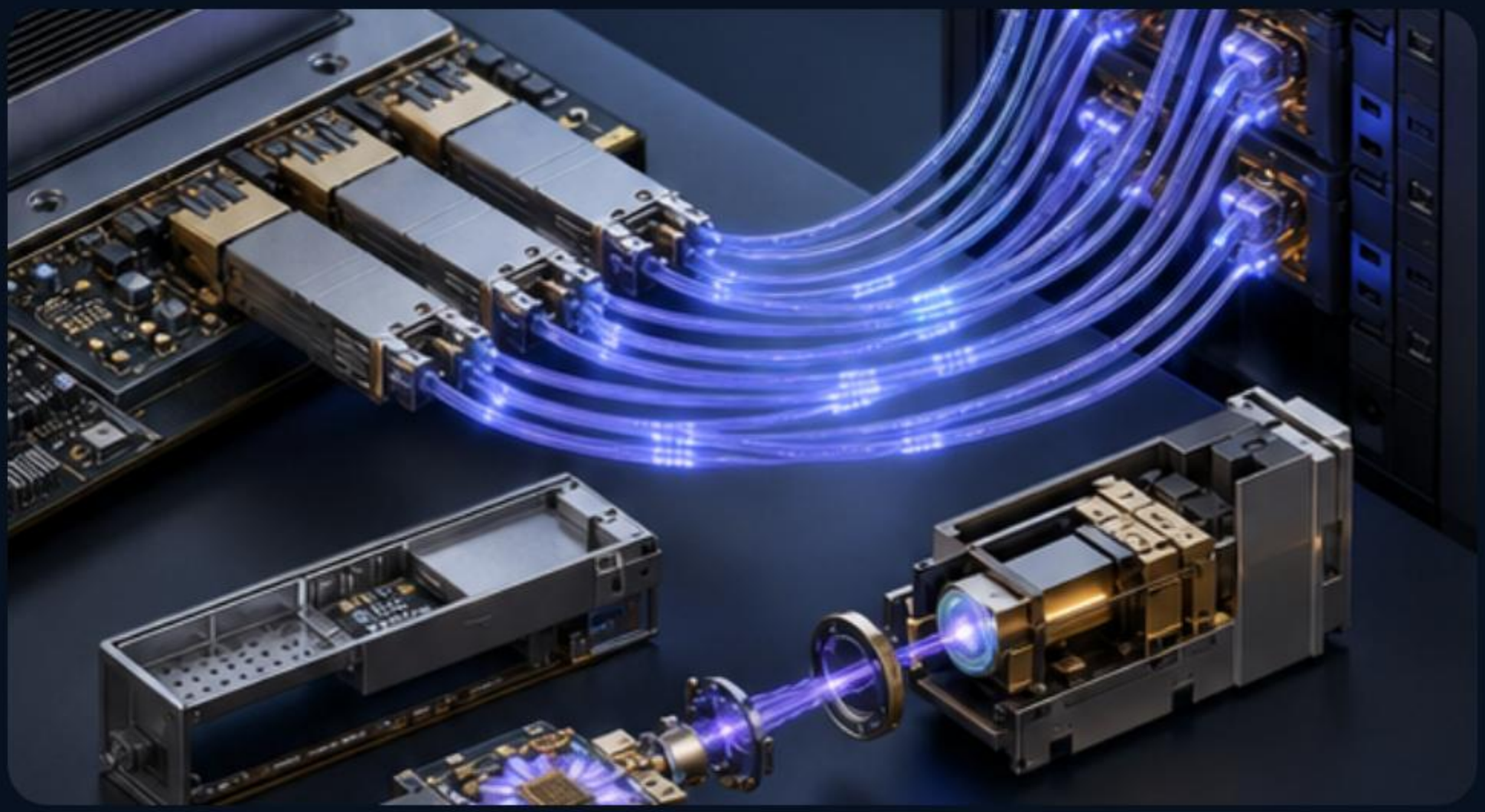
Higher-voltage DC, solid-state transformers, GaN/SiC and faster protection.

VENTURE WEDGE

Own a reliable control point in the power path, not the entire data center.

2 - DATA THROUGH

Optics is moving closer to compute



WHAT BREAKS

Electrical links struggle with reach, bandwidth density and I/O power.

WHAT CHANGES

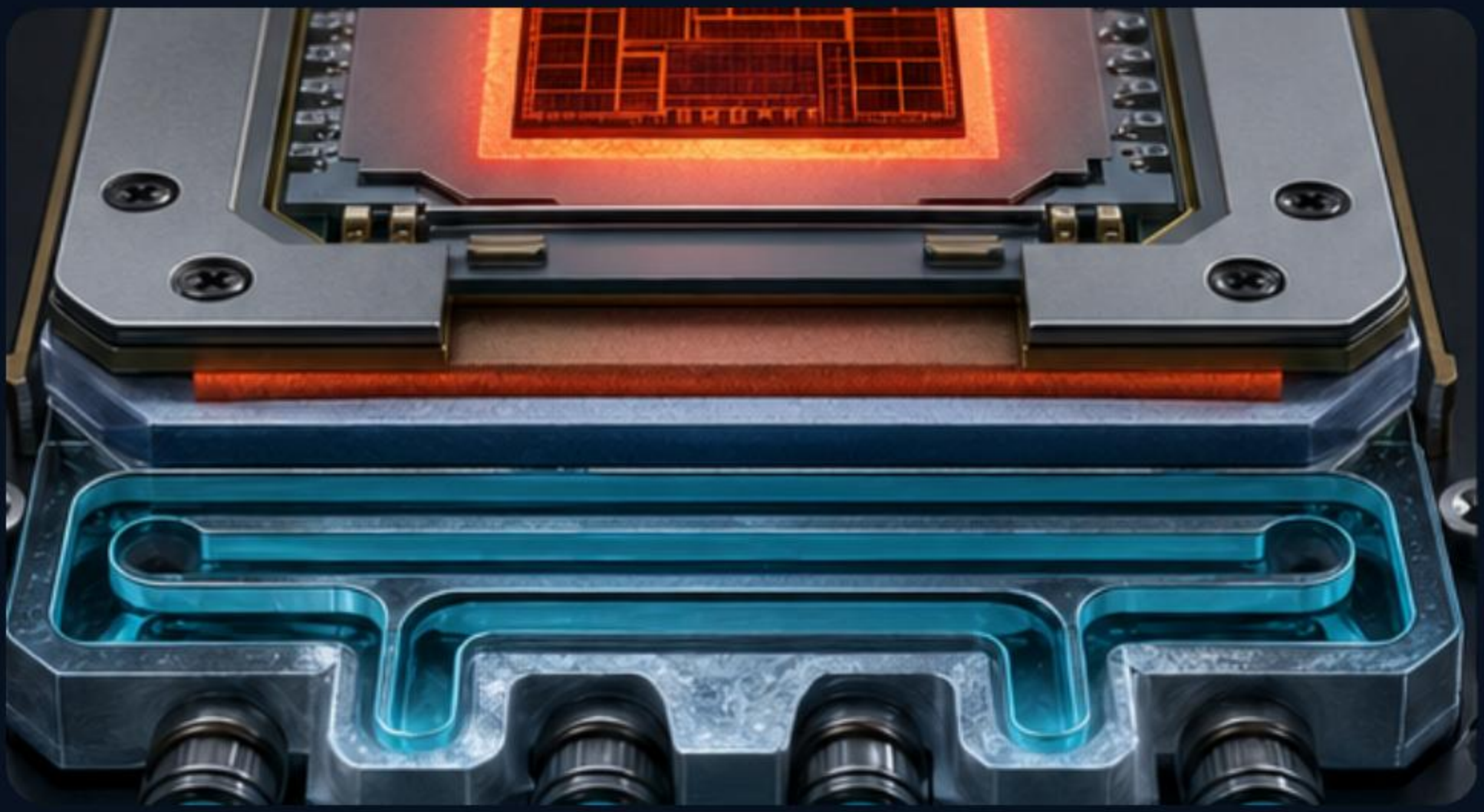
Co-packaged optics arrives first; optical I/O beside compute is the larger prize.

VENTURE WEDGE

Lasers, modulators, optical engines, coupling, packaging and test.

3 - HEAT OUT

The thermal bottleneck sits at the interfaces



WHAT BREAKS

Bulk conductivity alone cannot solve contact resistance, stress and aging.

WHAT CHANGES

Advanced TIMs, cold plates, liquid loops and package-level thermal design.

VENTURE WEDGE

Prove aged package-level performance, manufacturability and qualification.

The three bottlenecks cannot be separated

Every gain in compute intensifies the other constraints.

01 **More compute**

increases system density

02 **More power + data**

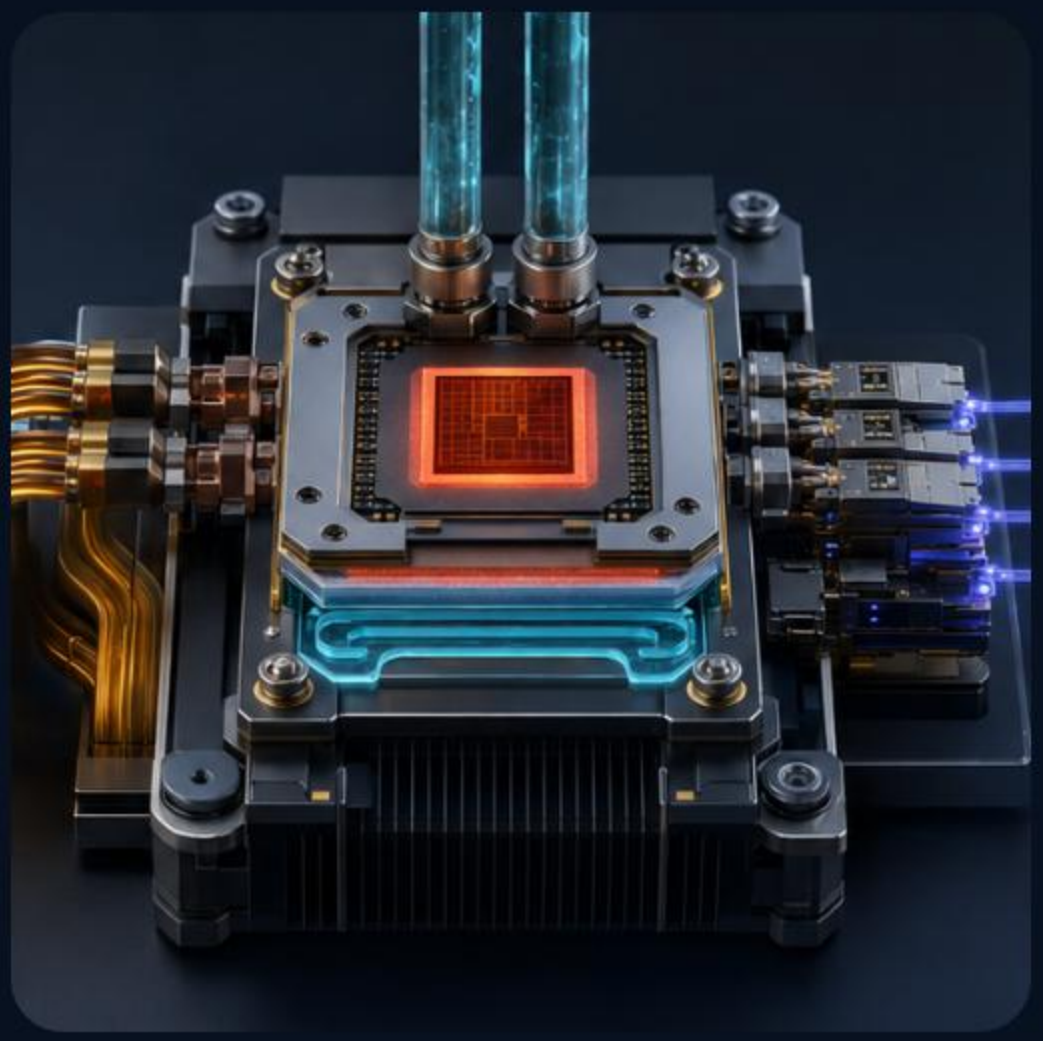
raise electrical losses

03 **More heat**

changes package and facility design

04 **Co-design**

becomes unavoidable



The system, not the component, sets the winning performance target.

Where startups can create value

The investible layer is usually a narrow, unavoidable control point.

POWER

Power conversion | Integrated regulation | DC protection

OPTICAL

Lasers + modulators | Optical engines | Fiber coupling

THERMAL

Advanced TIMs | Cold plates | Thermal metrology

The test

Can the startup show measurable system impact and reach qualification without incumbent-scale capital?

The investment question is not:

"Is the technology impressive?"

It is:

Can it become an unavoidable control point in a production system?

01	**System delta**	Does the advantage survive package conditions and aging?
02	**Qualification owner**	Who can approve adoption, and are they engaged?
03	**Manufacturability**	Can partners make it at credible yield and cost?
04	**Time to proof**	Can a customer decide within 12-24 months?
05	**Defensibility**	What protects value after qualification?

Oyon DeepTech maps the physical bottlenecks behind next-generation computing.

Source: Oyon DeepTech domain synthesis | July 2026