

Diamond cooling for next-generation AI infrastructure

Adatom Technologies

Daniel Ranke, Founder

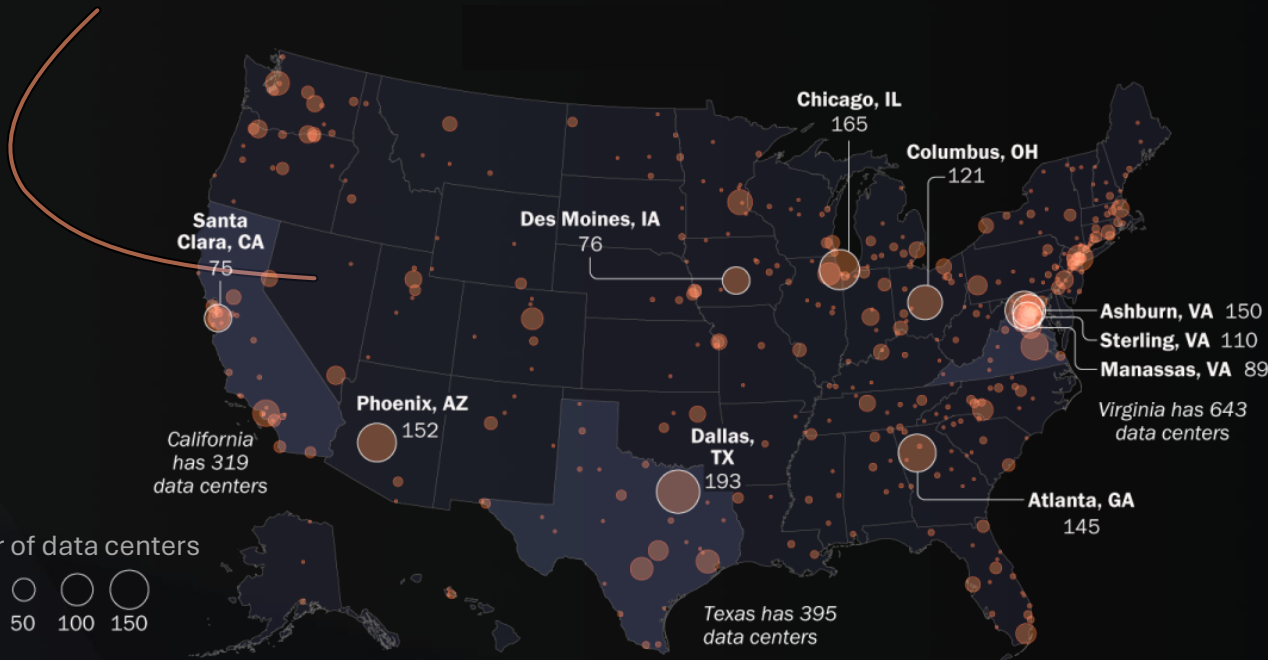
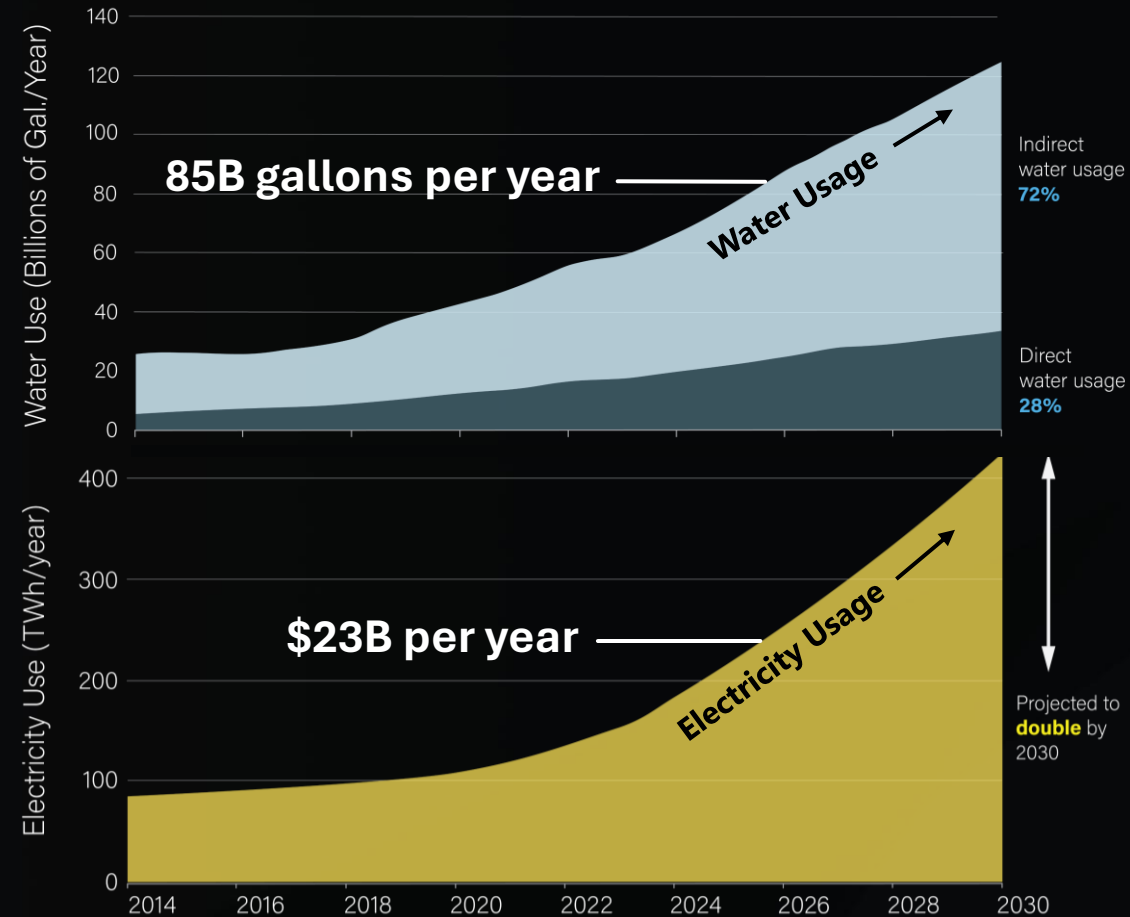


Booming AI datacenters demand increasing costs



Advances in AI require rapid expansion of datacenters and AI factories across the US, and they need resources

Datacenters have ballooning water and electricity costs

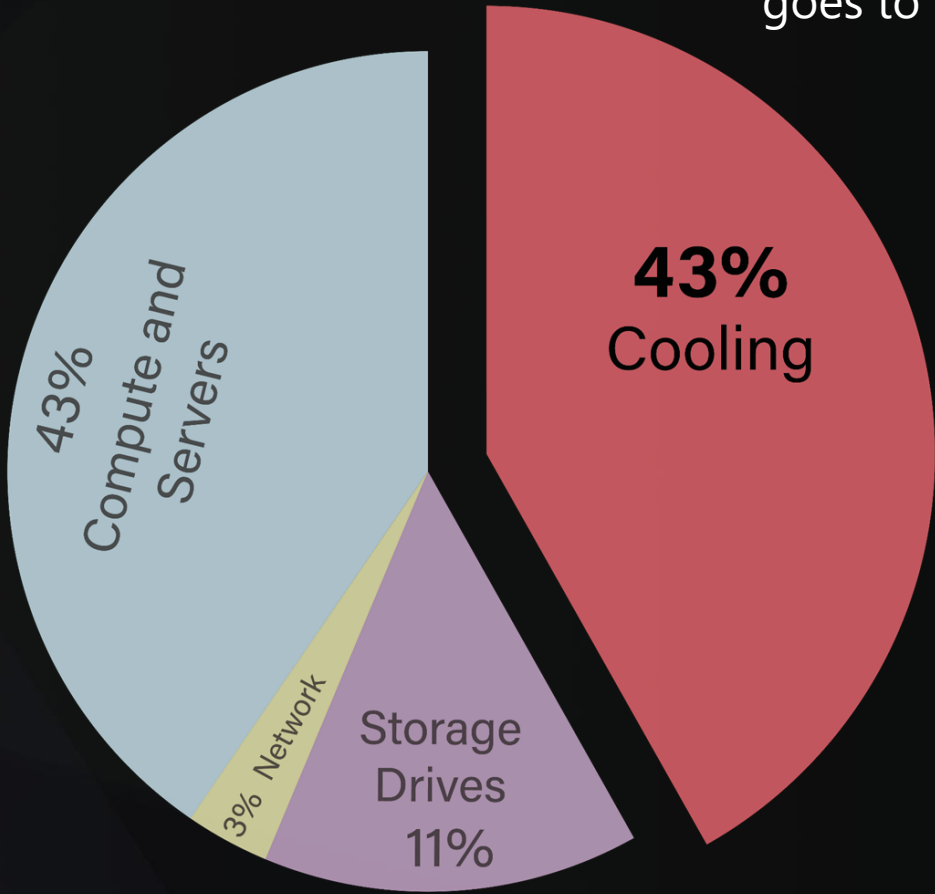


AI datacenters/factories will account for 380 million tons of CO₂ per year by 2030

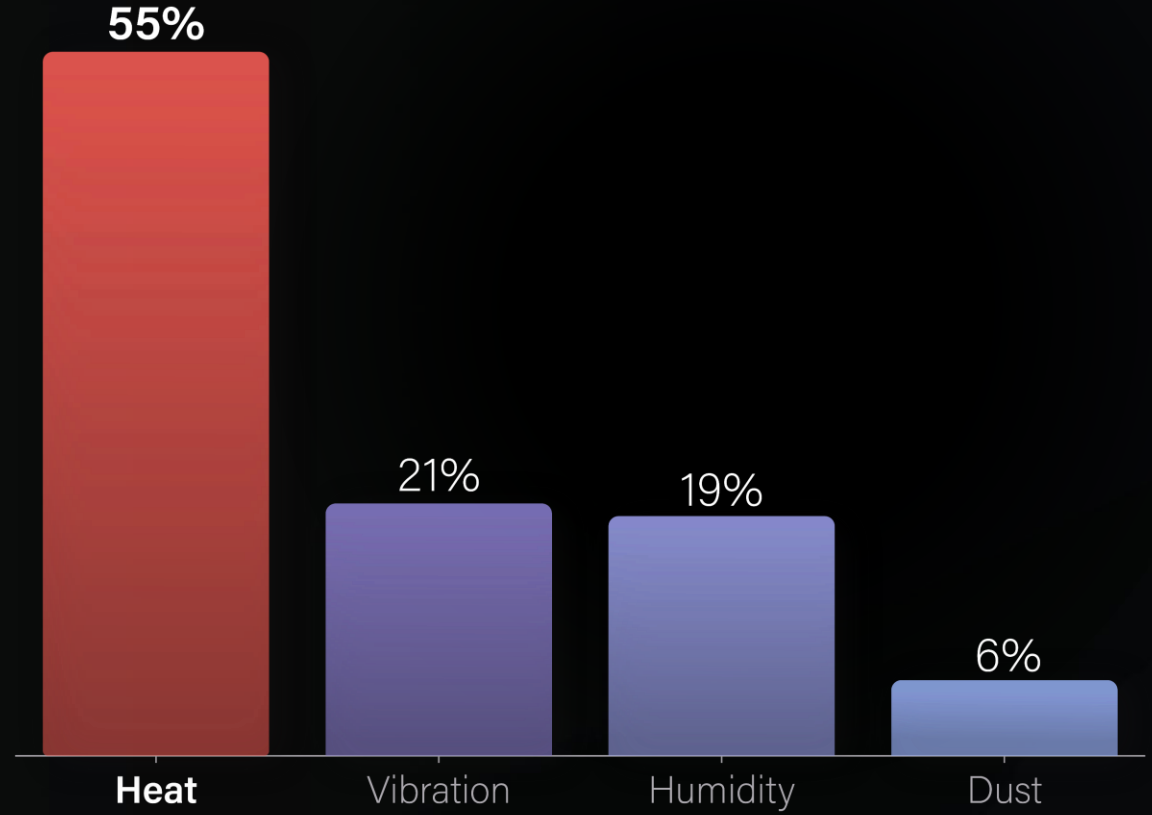
Commercialization and impact

35-45% of AI datacenter energy goes to cooling

Why?



Thermal Effects Cause >50% of AI Chip Failure



Cooling is absolutely necessary for long-lasting compute platforms

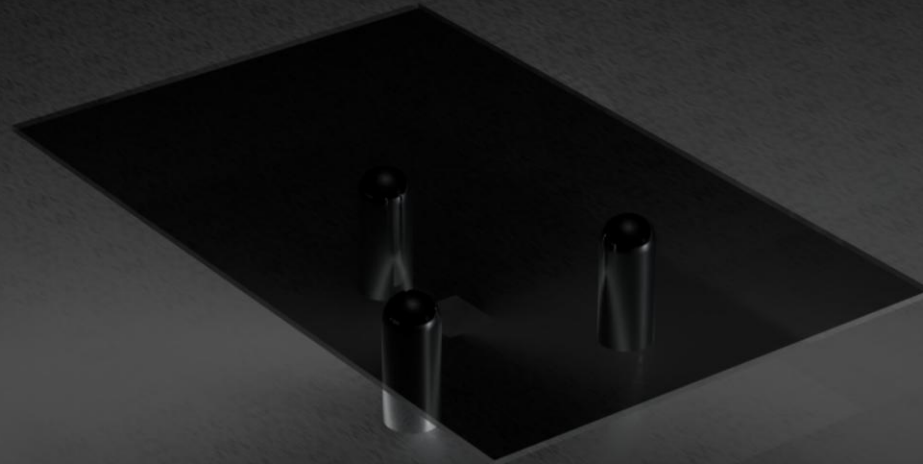
How can it be done with less energy?





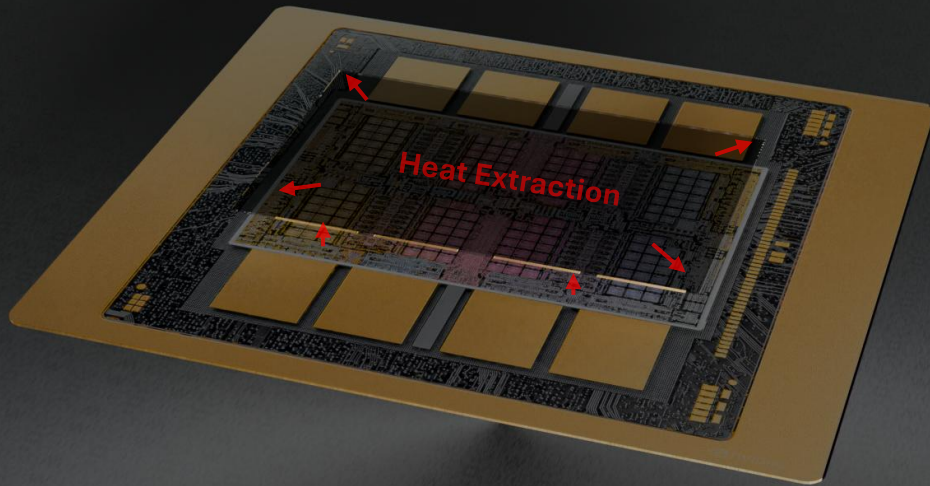
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Diamond-based passive chip cooling



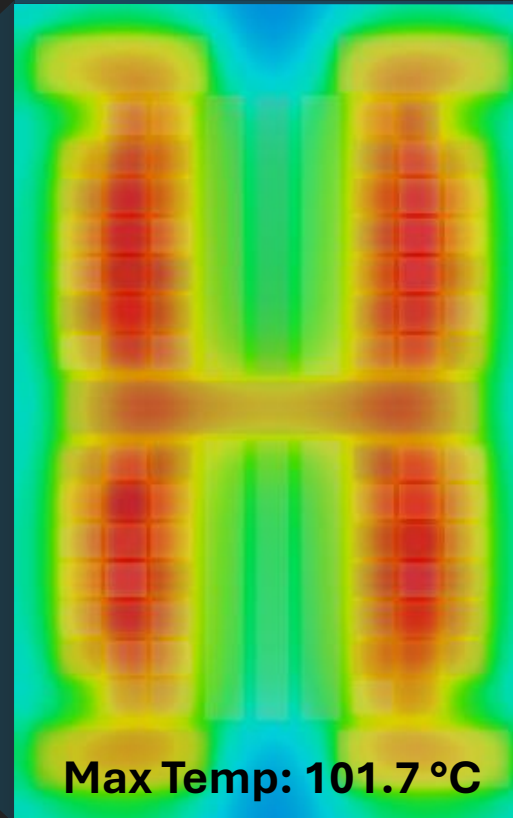
Cooling performance

Nvidia Blackwell GB200 – 2kW AI Powerhouse



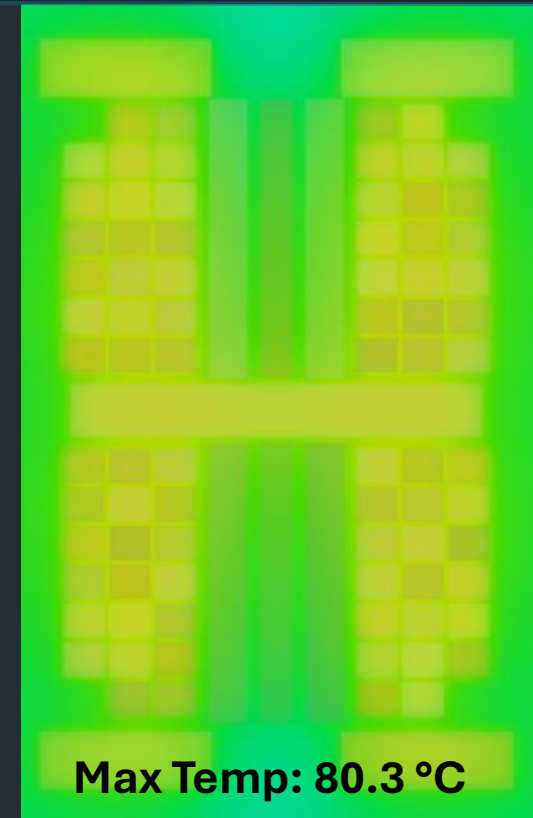
Diamond bonding directly to die allows for efficient heat extraction and hotspot elimination

Standard Cooling

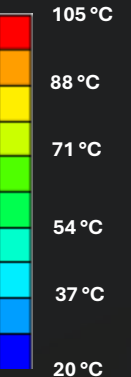


Max Temp: 101.7 °C

Diamond Cooling



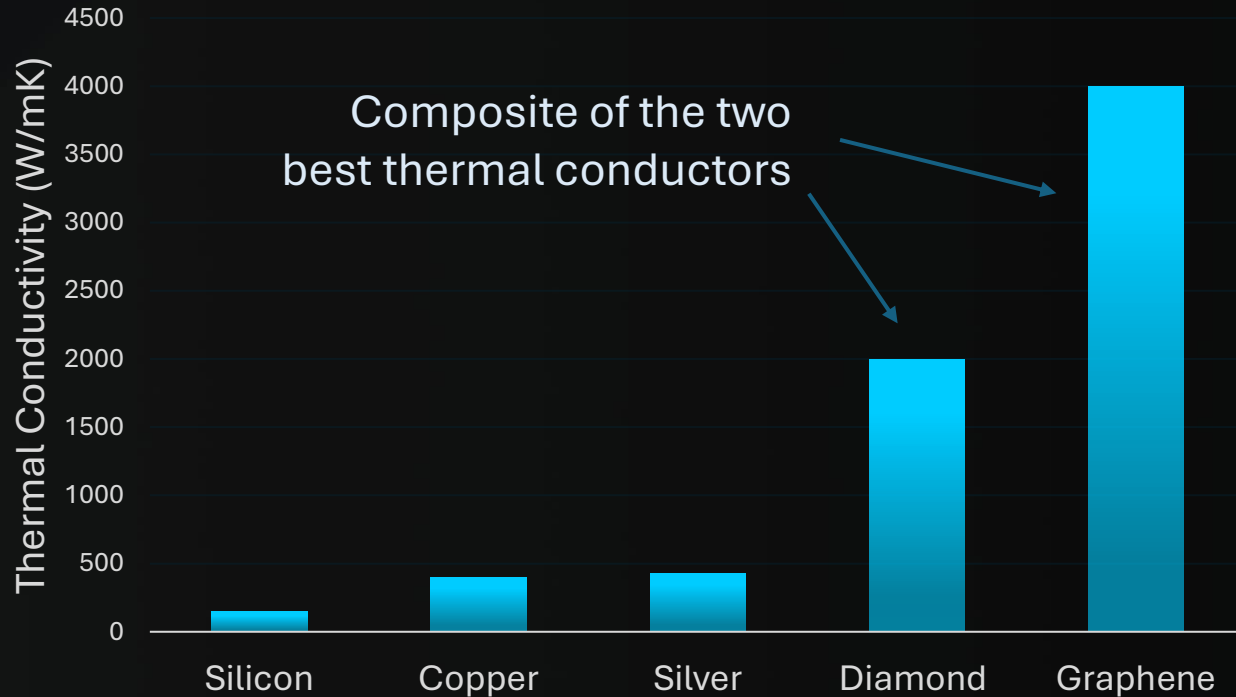
Max Temp: 80.3 °C



Over 20 °C decrease in operating temperature with *identical cooling power*

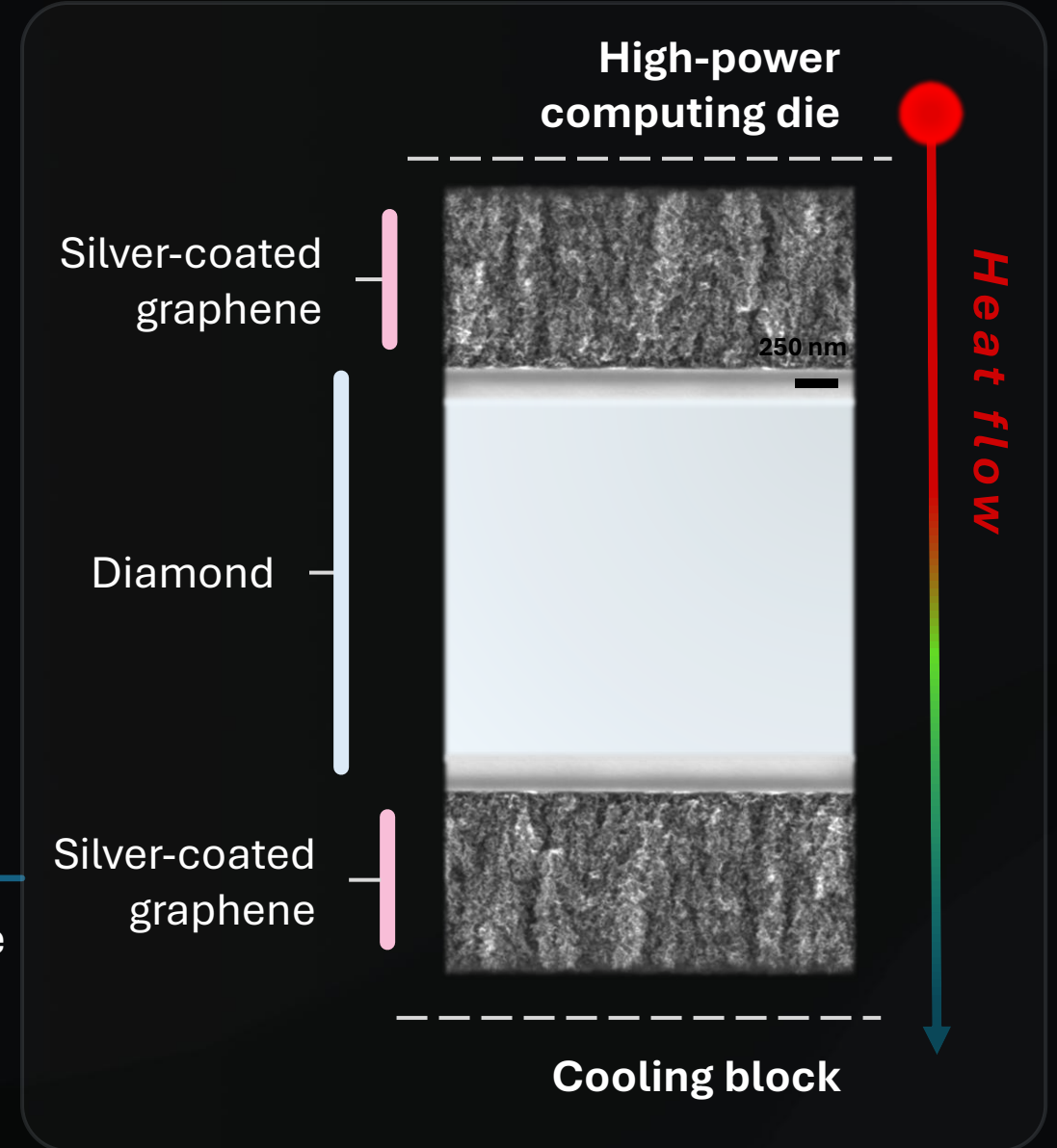


How does it work?



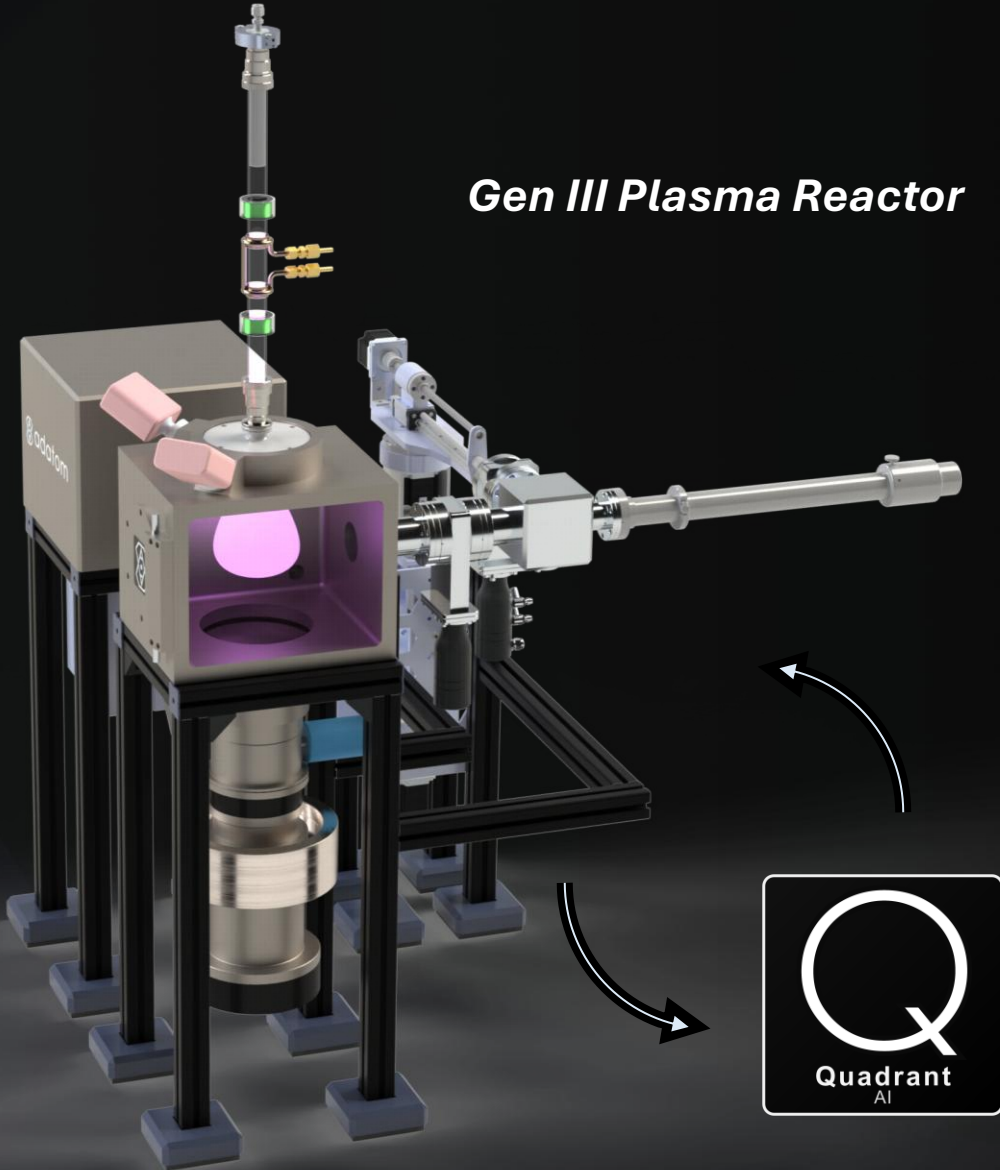
Diamond and graphene are the **best** thermal conductors

1. Graphene creates a low resistance thermal interface to the die ($<0.22 \text{ mm}^2/\text{K W}^{-1}$)
2. Diamond rapidly spreads heat in 3D away from hotspots



Adatom's core tech - Smart reactors

Gen III Plasma Reactor



Our reactors use proprietary plasma technology to convert greenhouse gases to solid carbon

Dense Plasma

Fusion-based high efficiency, high-purity plasmas

Artificial Intelligence

Rapid closed-loop materials discovery and optimization

Higher Scalability

Up to 3x larger (300 mm+) diamonds than the competition



What's our advantage?

Need to outfit 10s of millions of chips per year

- D F
- DIAMOND SEMICON
- AKASH SYSTEMS
- elementsix™



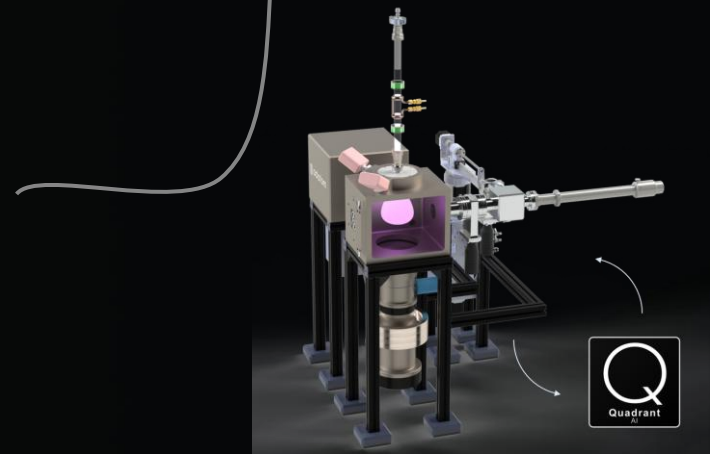
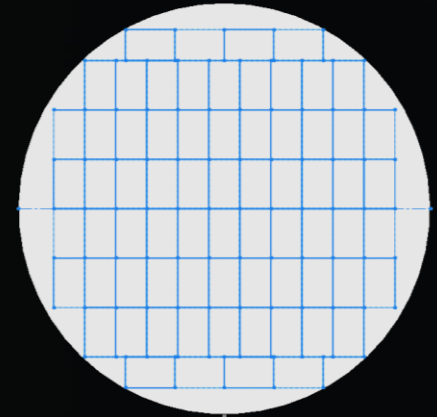
3 heat extractors per wafer

Leading competitors' wafers

72 heat extractors per wafer



Our wafers



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Our wafers can make 24x more heat extractors than the leading competitor



Commercialization and impact

Less Electricity: Up to 50% lower kWh/FLOP

- Removing **>76 million** tons of CO₂ emissions per year (US, \$11B equivalent)

Less Water: Up to 55x less water consumption

- Saving up to **19 billion** gallons of water per year (US)

>\$3B accessible market



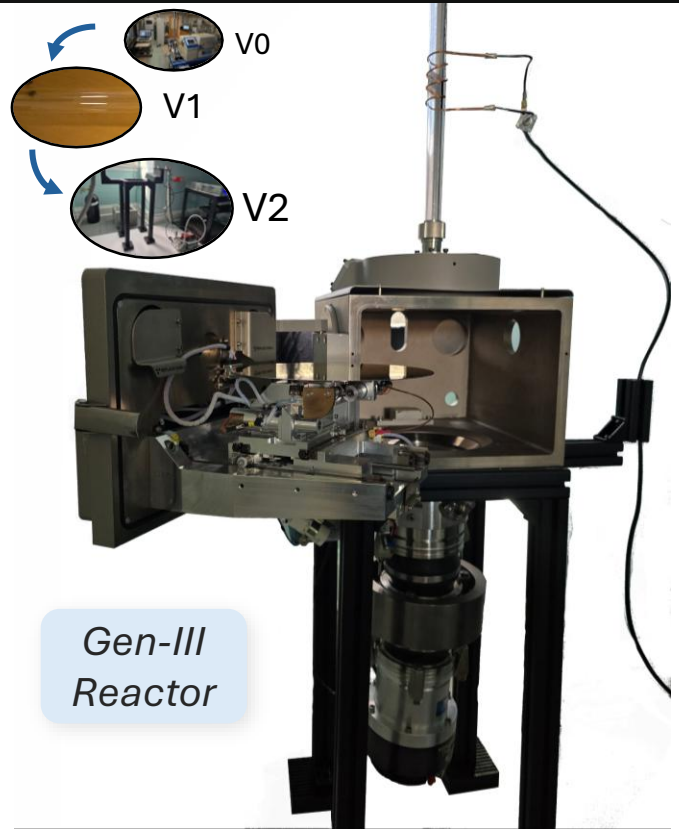


What's our progress?

Stage: Pre-seed stage with key product demonstration and ongoing commercial pilots

Moat: Intellectual moat on diamond cooling, reactor design, and AI models

Team: Three GT and CMU PhD/MS bringing materials, AI, and business expertise

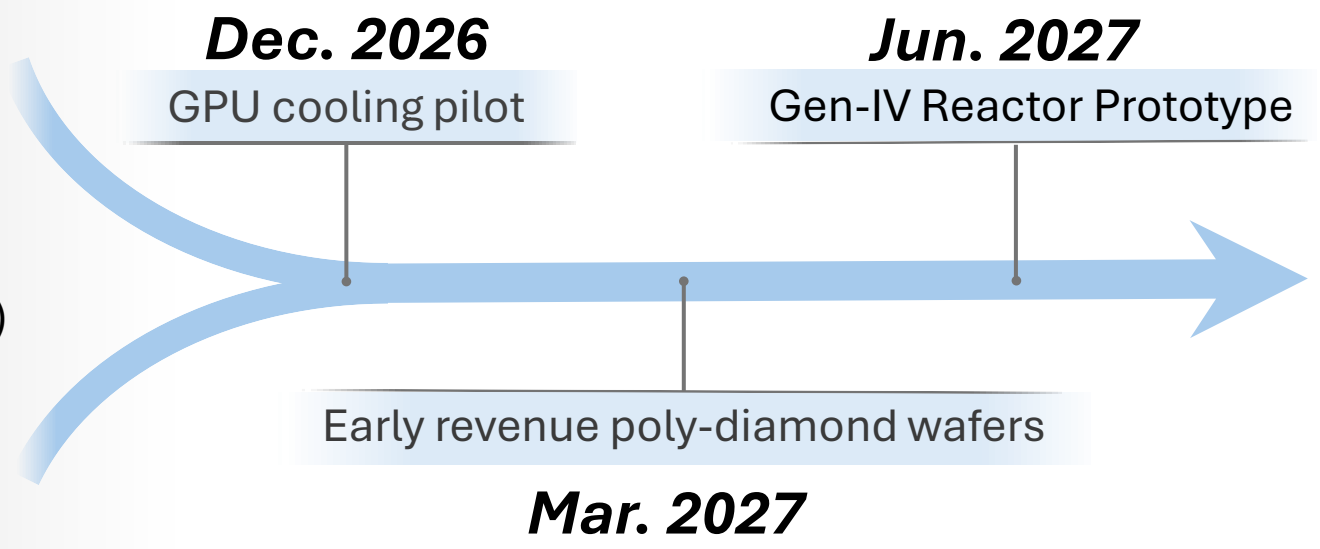


Gen-III
Reactor

Wafer-scale graphene



Cm-scale Diamond (nc)





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Redesigning carbon at the atomic scale

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