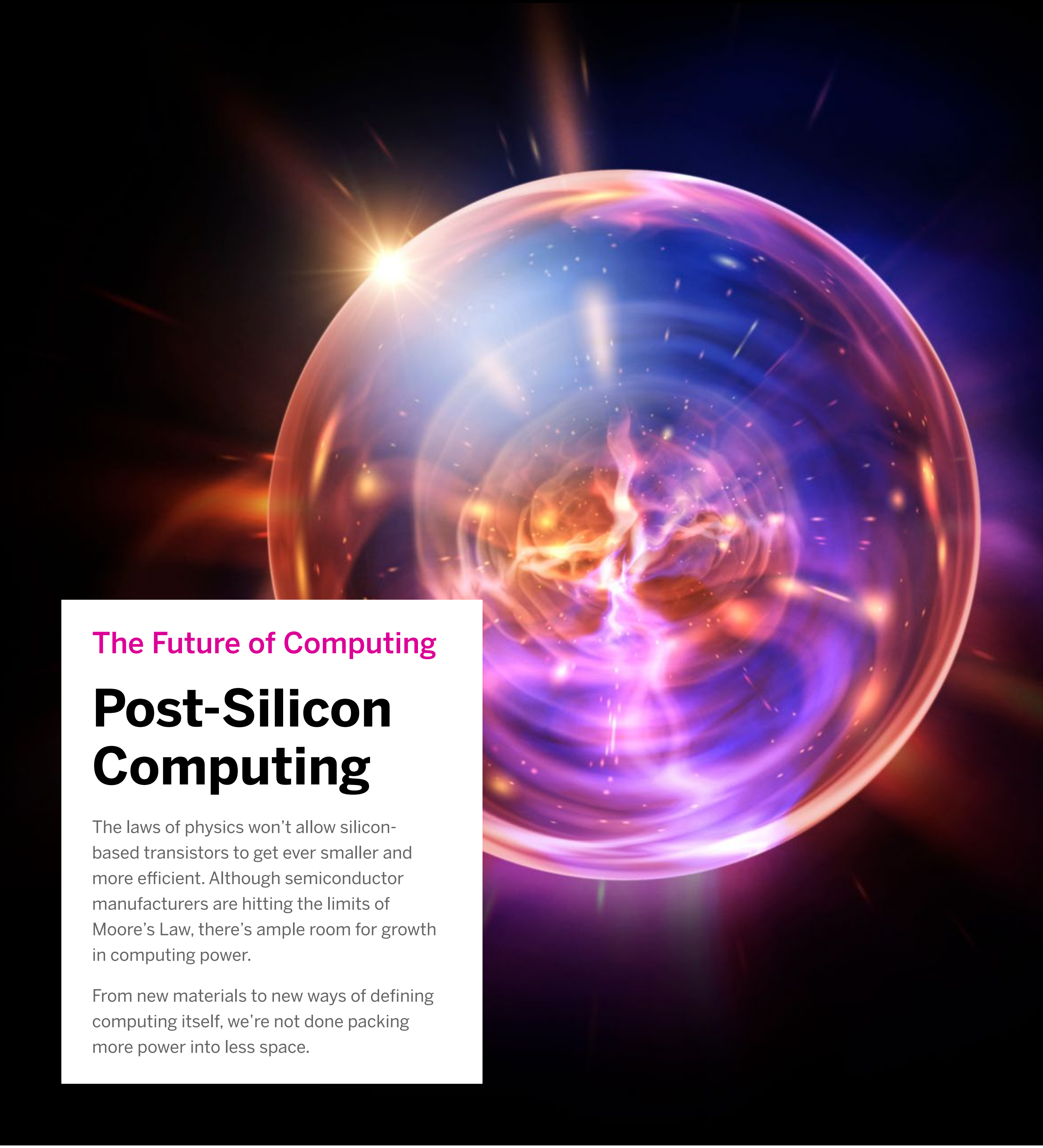

The Future of Computing

Post-Silicon Computing

The laws of physics won't allow silicon-based transistors to get ever smaller and more efficient. Although semiconductor manufacturers are hitting the limits of Moore's Law, there's ample room for growth in computing power.

From new materials to new ways of defining computing itself, we're not done packing more power into less space.

The Limits of Silicon

Chips have become so small and complex, requiring such costly tools and processes, that maintaining such a pace is no longer financially feasible.

If transistors get any smaller, they may no longer abide predictably by the usual laws of physics.

What May Replace It

- Chips based on the superconducting nanomaterial graphene will move more electrons faster in less space, possibly extending Moore's Law for microprocessors for several years.
- Quantum computers will use quantum bits, or qubits, which can be a zero, a one, both, neither, or something in between, all at once. This will make them millions of times faster than conventional computers in specific applications.
- Personal computers will nibble on small chunks of larger problems in distributed networks that collectively rival the speed of the most powerful supercomputers.
- Computing using photons to map data onto light-intensity levels and then varying the light intensity to perform calculations at nanoscale would enable high-efficiency, low-power computing at the literal speed of light.
- Synthetic DNA may hold zettabytes of data in highly stable, easily readable, long-term storage.
- Neuromorphic chips would work like the human brain, processing and learning from data as quickly as it's generated.

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[6 Surprising Innovations for the Future of Computing]

> The semiconductor industry no longer assumes it can keep doubling microprocessor power every two years.