

Math Can Replace Traffic Lights

Self-driving cars could eliminate stoplights using coordination algorithms.

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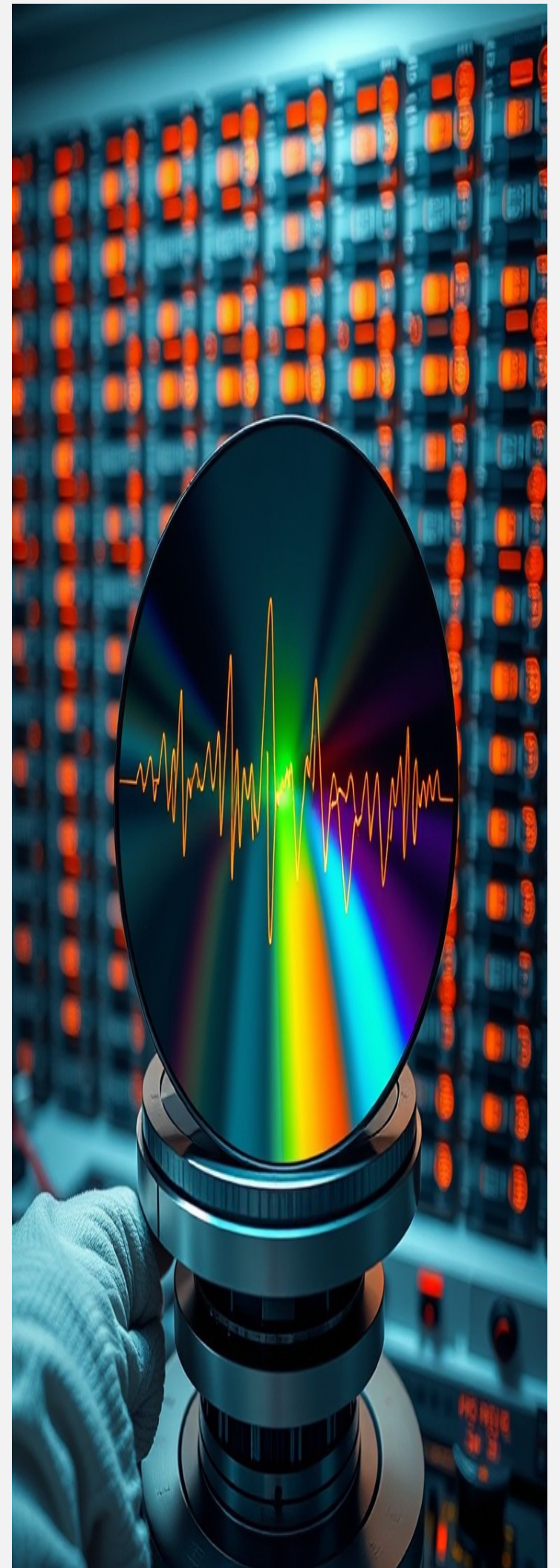
simulations

Traffic Flow Simulations

Computer models tested a stoplight-free intersection using cooperative vehicle behavior.

The simulations, conducted by Boston University professor Christos Cassandras, showed that removing traffic lights and replacing them with coordinated autonomous vehicle maneuvers improved traffic flow, safety, and energy efficiency. This approach relies on real-time communication between vehicles based on position, speed, and distance—core principles applicable to AI-driven semiconductor systems managing real-time data streams.

Source: IEEE Spectrum • Published October 08, 2026
<https://spectrum.ieee.org/smart-car-researcher-eliminate-stoplights>



01

AI Enables Event-Driven Chip Control

Just as autonomous vehicles react to discrete events like nearby cars or changing positions, advanced semiconductor systems now rely on event-driven logic—where processing triggers based on real-time data rather than fixed clocks. This shift, pioneered in systems engineering since the 1980s, is foundational to modern AI accelerators and low-latency chip designs. Event-driven control reduces power consumption and increases responsiveness, essential for next-gen edge AI hardware.

02

Safety Through Predictive Coordination

Cassandras's work proves that safety in autonomous systems isn't achieved through rigid rules, but through predictive coordination. This mirrors how AI chips in modern fabs use predictive thermal and power models to avoid failure before it occurs. The same mathematical rigor that ensures a vehicle safely changes lanes can be applied to prevent chip-level defects during fabrication—where timing, position, and energy thresholds are monitored in real time.

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