Simulating Valleytronics Logic at Gate Level

A C++ Library and Example for Building Fully Electric Valleytronic Processors

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Introduction to Valleytronics

- Valleytronics is an alternative to CMOS logic that takes advantage a unique property of certain classes of semi-metals.
- It is the subject of active research, with isolated circuits being produced, but large-scale production still a few years off.

Valleytronics vs. CMOS

CMOS logic takes advantage of the Pauli Exclusion principle to create diodes and transistors. These allow easy voltage manipulation, but no additional constraints. Valleytronics offers a

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- Encryption/Decryption of Off-Chip Memory
- Secure Context Manager

Reversible Logic
The Landauer Limit and Beyond

Tamper-Evident Processing

Verifiable computations need a way to identify and prevent operations from being tampered with.