Cool Stuff @ SC22
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Parallel Bit Pattern (PBP) Computing

A new, quantum-inspired, model for parallel computation:

- An alternative to quantum
- Efficient bit-serial SIMD

The potential to reduce power per computation by orders of magnitude without exotic hardware
Array-of-Bits Representation

E-way entangled superposition uses $2^E$ bits:

- 2-way result is 25% 2, 50% 3, and 25% 5
- AoB bit patterns have very low entropy...
PBP as an Alternative to Quantum

Don’t use *Array-of-Bits (AoB)*; operate on *AoB chunk patterns*

- Symbolic optimization at gate level
- Exponential space+time reduction

Display shows 3 lines of scrolling code trace, bit-per-pixel AoB map of most recent *pbit* and SHOW *pbit*
PBP as Efficient Bit-Serial SIMD

Each entanglement channel is a PE!

- Only active bits kept for a pint
- Skips any repeated AoB operation

Display shows 3 lines of scrolling output, current line of code, count of pbit used, unique AoB chunks, and PBP: conventional gate activations