Cool Stuff @ SC22

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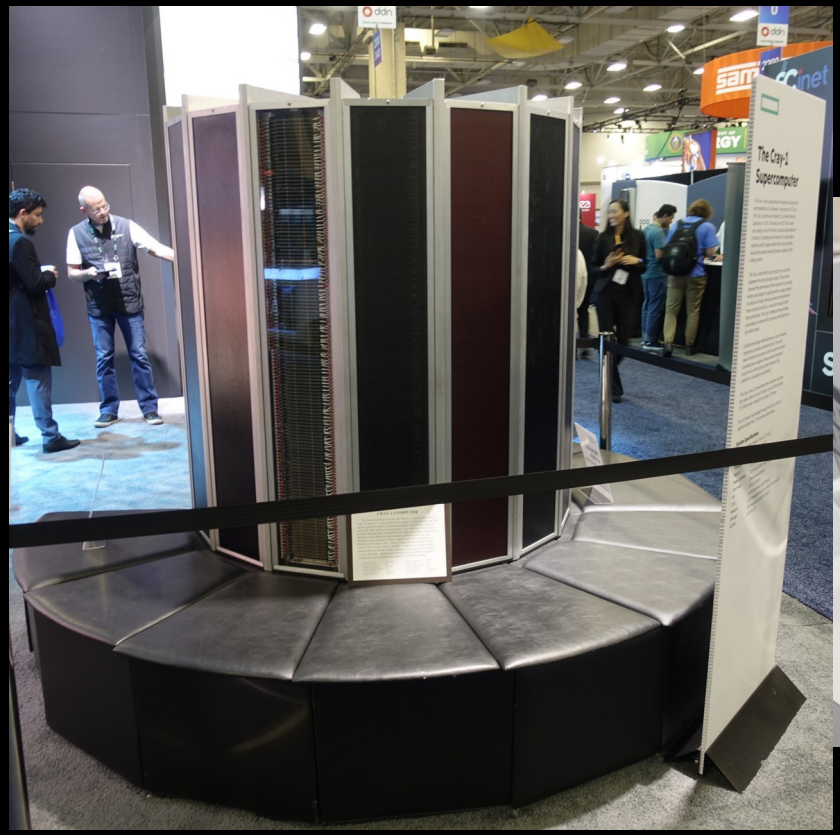

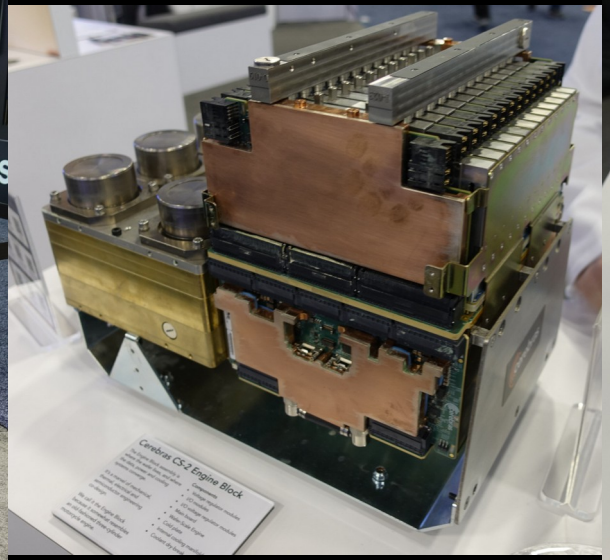

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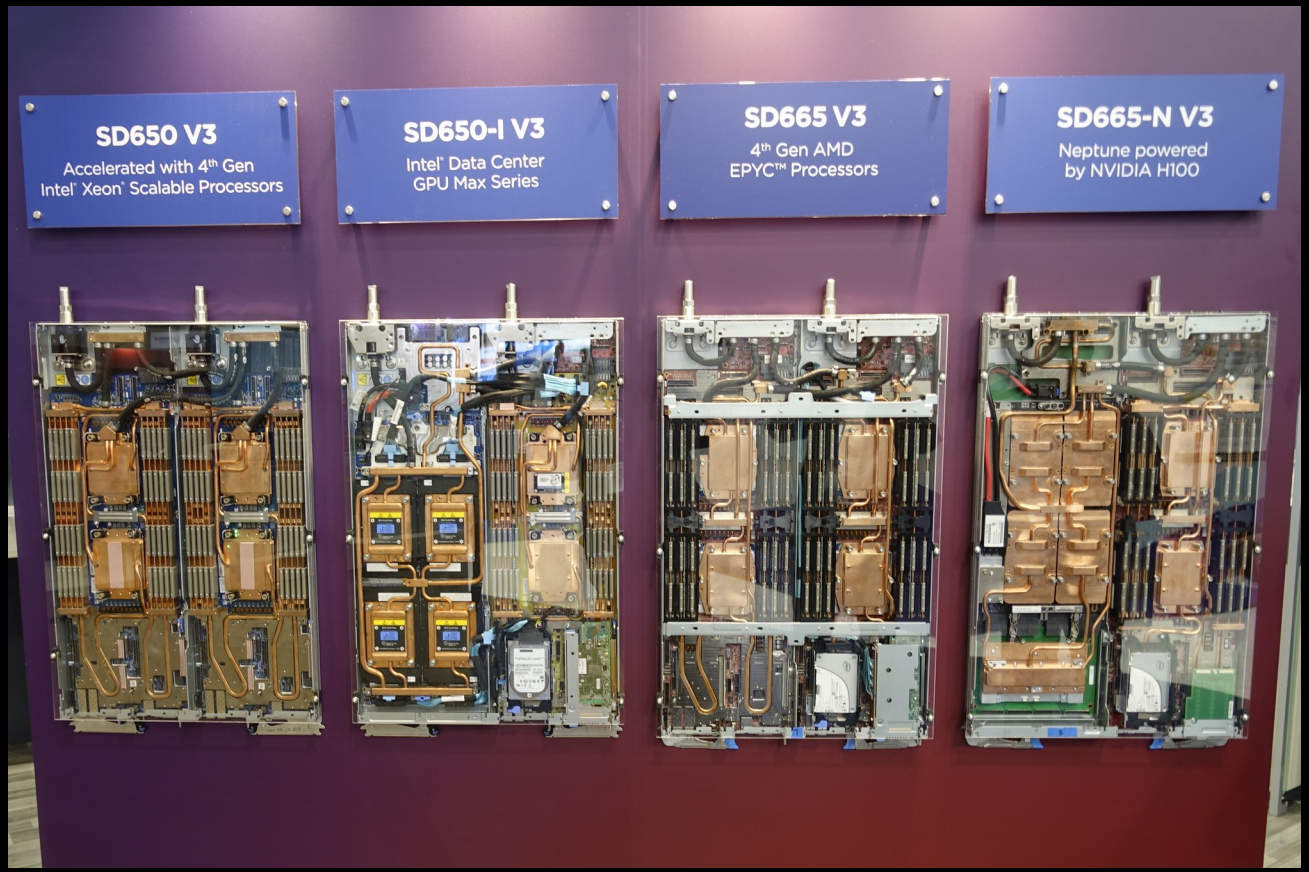

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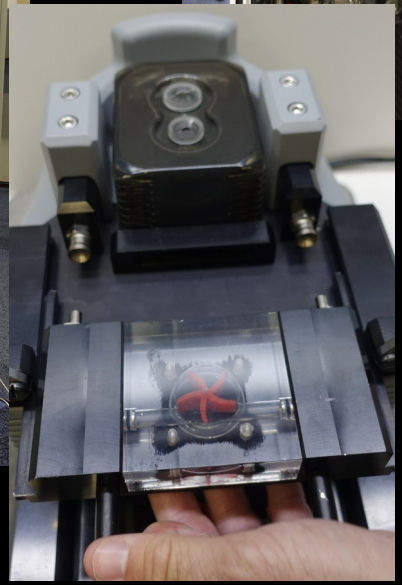
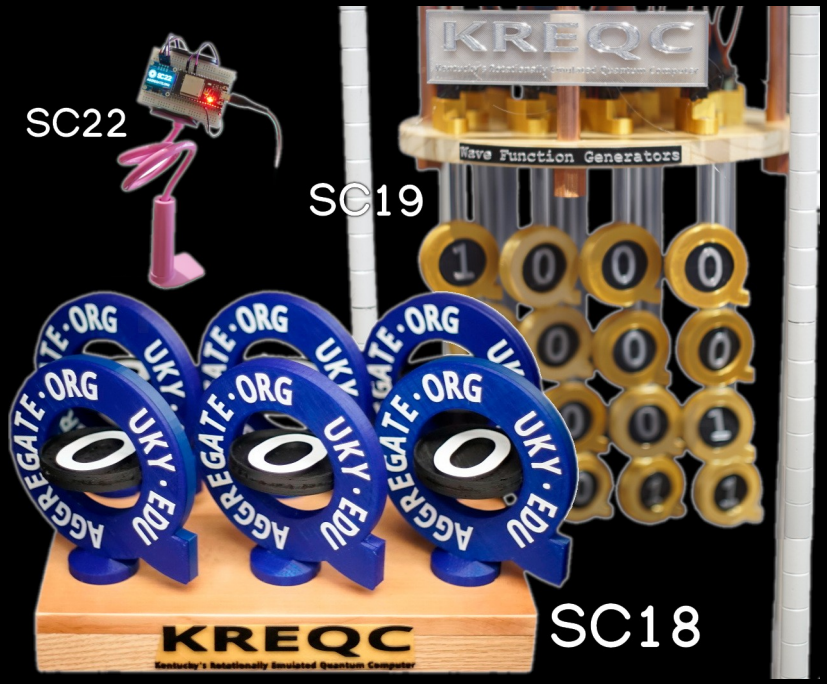


Parallel Bit Pattern (PBP) Computing

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



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Array-of-Bits Representation

E-way entangled superposition uses 2^E bits:

0	1	2	3
0	1	0	1
0	0	1	1

+

3	1	3	0
1	1	1	0
1	0	1	0

=

3	2	5	3
1	0	1	1
1	1	0	1
0	0	1	0

- *2-way result is 25% 2, 50% 3, and 25% 5*
- *AoB bit patterns have very low entropy...*

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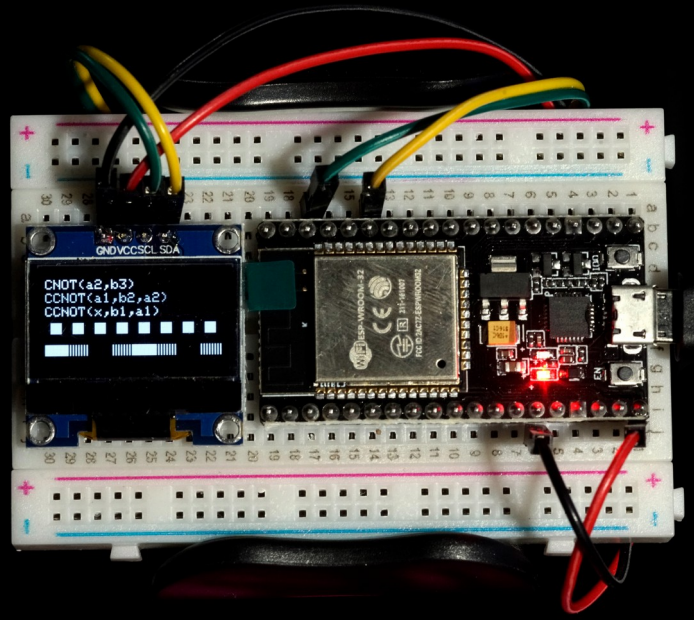
PBP as an Alternative to Quantum

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`



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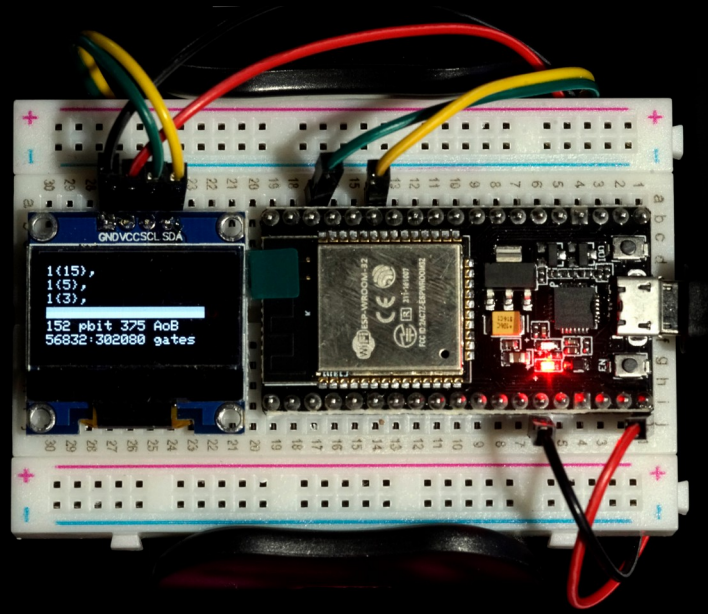
PBP as Efficient Bit-Serial SIMD

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*



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