## Best of Last Week – Doing away with spacetime singularity, quantum simulation butterfly and impact of skipping breakfast

December 4 2017, by Bob Yirka



The computational processing power of quantum bits (qubits) is poised to have

profound impacts on diverse fields of science and engineering. The picture is a photograph of a superconducting chip (area of entire chip: 1 cm2) consisting of 9 qubits in a 1-D array. Microwave pulses are applied to control the states of the qubits and their interaction and control the dynamics in the system. Such Josephson-junction based superconducting systems are a leading physical implementation for quantum computation and simulation processing. Credit: Erik Lucero, Google

(Science X)—It was a good week for physics as Brazilian physicist Juliano Cesar Silva Neves explored the possibility of vestiges of a universe previous to the Big Bang—and suggested that to understand the origins of the universe, we might have to do away with the idea of a spacetime singularity. Also, a combined team from MIT and Harvard University demonstrated one of the largest quantum simulators to date, offering a new way to manipulate quantum bits. And an international team conducted an experiment that showed that the arrow of time is a relative concept, not an absolute one—without violating the second law of thermodynamics. Also, a group from Google working with a team with members from the U.S., Greece and Singapore, used photons in a quantum chip to allow a butterfly to emerge from a quantum simulation —actually, a fractal structure known as the Hofstadter butterfly. And a team working in China set <u>a new record with 10-qubit entanglement</u> on a superconducting circuit.

In other news, a team at NASA <u>activated thrusters on Voyager 1 after 37</u> <u>years of disuse</u>, repositioning it so that its antenna could continue to point back at Earth. And a team at Virginia Tech College of Engineering showed <u>that it is better to leave a buffer for your bumper</u> when pulling up behind a car at a stop light, because shorter distances will not ensure that you get through the light before it changes. Also, a team with members from Harvard University and the University of Rochester working with young volunteers reported that <u>brain scans reveal why</u> rewards and punishments don't seem to work on teenagers. And an international team of researchers conducted an analysis of ancient DNA and announced that it revealed <u>a previously unrecognized genus of</u> extinct horses that once roamed North America.

And finally, if you are one of many who have taken to skipping breakfast as a means of losing weight, you might actually be making things harder on yourself—a team at Tel Aviv University found that skipping breakfast disrupts the 'clock genes' that regulate body weight, preventing proper glycaemic control.

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