

What quantum supremacy really means

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More than a year ago, Google announced that they had reached a new milestone in quantum computing that they refer to as « quantum supremacy ». They claimed that their quantum chip had performed a task that would take thousands of years to simulate on the largest existing supercomputer. In this talk, I will first review the experimental findings. Then, I will challenge their claim and show that, while it does indeed require an exponentially large computing time to simulate a perfect quantum computer, simulating a real one with a finite fidelity is much easier. I will present how it can be done with quantum states compression techniques borrowed from many-body theory.