

Benchmarking Near-term Quantum Computers

As the field marches towards quantum advantage with near-term quantum processors, it becomes imperative to characterize, verify, and validate performance. An outstanding scientific challenge in the community is a scalable set of metrics or experiments which can shed light on the usability of a device for near-term algorithms. We propose a device-independent metric called the quantum volume and use it to characterize recent systems built at IBM. Moreover, it becomes critical to explore techniques to extend the computational reach of noisy systems, be it through understanding underlying physics, or more efficient circuit compilation.