

## Theoretical foundations of quantum advantage in quantum algorithms

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## Abstract

In this talk I will describe recent developments on establishing theoretical foundations of quantum advantage in quantum algorithms. I will start with some well-known quantum algorithms and discuss their potential applications. I will then present recent results that establish the theoretical foundations of quantum advantage for these algorithms, as well as recent works that successfully "dequantize" them in some special cases. I will conclude by mentioning challenges and open problems.