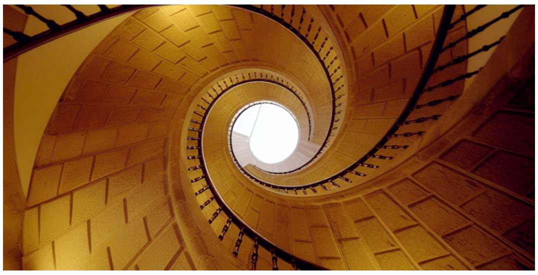

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# Making the case for quantum machine learning

*Tuesday, May 30, 2023 2:20 PM (50 minutes)*

Quantum machine learning (QML) is often put forward as one of the most likely quantum applications to bring about useful advantages, perhaps even in the near term.
Large-scale quantum computers, once available, will give definite answers to whether this is true, but to make the most out of the significant investments in experimental quantum computing, it is important to try to learn as much as possible already now. And much can be done both using theory, and empirical approaches.
At present, we can work on identifying when (and if) advantages can be already theoretically proven; in parallel we can also investigate how to probe the performance of quantum methods experimentally, even beyond the small sizes current devices allow.

In this talk we will review recent progress in answering these questions; we will present results proving superpolynomial speed-ups and learning advantages in data analysis tasks, specifically well suited for analyzing highly correlated (i.e. genuinely quantum) systems. Regarding more empirical approaches, we will reflect on recent ideas on how to simulate larger and deeper quantum machine learning algorithms which may give us glimpses of what larger quantum computers will bring.

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