The quest for rigorous advantages with near-term quantum computing devices

Abstract:
Large-scale quantum computing and simulation experiments require substantial classical computing power to control the experiment and process the results. This necessarily creates information-transmission bottlenecks at the interface of quantum and classical realms, thus preventing us from using existing architectures to the best of their capabilities.

In the talk it will be explained how to take into account both, quantum and classical computing resources, to develop scalable quantum-to-classical converters. Dubbed “classical shadows”, they are simple enough to execute on current quantum hardware and come with rigorous performance guarantees. Applications abound and range from estimating quantum properties [1] to new synergies with machine learning [2] and even new types of quantum advantage [3].


For those who want to know more about R. Kueng’s collaboration with Austrian physicists:


Join Zoom Meeting
https://jku.zoom.us/j/96702651025?pwd=SSsza1kvb296bkR2dld3Z2t2OGczdz09
Meeting-ID: 967 0265 1025
Password: clasSh8d0w