

FM 1: Plenary Talk: Quantum Machine Learning

Time: Monday 8:30–9:30

Location: Audi Max

Plenary Talk

FM 1.1 Mon 8:30 Audi Max

Tensor Networks for Classical and Quantum Machine Learning — ●MILES SToudenMIRE — Flatiron Institute, New York, NY, USA

Tensor networks are a powerful tool developed in physics to describe wavefunctions, but which could have broad applicability outside of physics too. One interesting area of application is machine learning, where the adjustable parameters or “weights” of the function to be

learned can be viewed as a large tensor, represented as a tensor network. I will review some empirical and theoretical results on the use of tensor networks to learn classical data. One interesting advantage of tensor network machine learning models is they can be implemented on either classical or quantum hardware, since they are precisely equivalent to class of quantum circuits. This points toward some interesting directions, such as whether a quantum computer can be viewed as a device for contracting tensors, and how to best define the boundary beyond which quantum computers become useful.