

4CS21-2021-000064

Abstract for an Invited Paper  
for the 4CS21 Meeting of  
the American Physical Society

**Neural Networks and Machine Learning in Condensed Matter Physics Research: Two Examples**

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Neural networks are a powerful modern tool whereby a computer learns to make predictions based on a set of training data. This talk will discuss some of the fundamental aspects of neural networks in the context of two recent examples from my research. The first application is predicting the temperature of quantum dots based on measurements of the quantum dot photoluminescence, in order to potentially create small localized temperature sensors. The second application is predicting the properties (frequency, mode pattern) of a specific resonant mode of a cylindrical metal shell (a "cavity") filled with bits of high dielectric material, in order to design better microwave resonators for e.g. use in spin resonance experiments.