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Exploring many-body physics with deep networks GIACOMO TORLAI, University of Waterloo, JUAN CARRASQUILLA, Perimeter Institute, DAVID SCHWAB, Northwestern University, ROGER MELKO, University of Waterloo — The introduction of neural networks with deep architecture has led to a revolution, giving rise to a new wave of technologies empowering our modern society. Although data science has been the main focus, the idea of generic algorithms which automatically extract features and representations from raw data is quite general and applicable in multiple scenarios. Motivated by the effectiveness of deep learning algorithms in revealing complex patterns and structures underlying data, we are interested in exploiting such tool in the context of many-body physics. In this talk we will focus on how to extract information about the physics of a many-body system from the generative training of a deep network, and ultimately consider discriminative tasks, such as phase diagrams estimation and critical points detection. We will discuss results for different classical spin systems, including models with quenched disorder.

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