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title	Revealing quantum chaos with machine learning	Revealing quantum chaos with machine learning
publication_date	2020-02-05 00:00:00	2019-02-25 00:00:00
source	SupportedSources.INTERNET_ARCHIVE	SupportedSources.INTERNET_ARCHIVE
journal	American Physical Society (APS)	
volume		
doi	10.1103/physrevb.101.064406	
urls	• https://web.archive.org/web/20201103034306/https://repository.tudelft.nl/islandora/object/uuid%3A67343b2f-15d6-4a01-ad27-8252d1bcc0db/datastream/OBJ/download	• https://web.archive.org/web/20200829075013/https://arxiv.org/pdf/1902.09216v1.pdf
id	id-3249322638761493040	id-179669101310564055
abstract	Understanding properties of quantum matter is an outstanding challenge in science. In this paper, we demonstrate how machine-learning methods can be successfully applied for the classification of various regimes in single-particle and many-body systems. We realize neural network algorithms that perform a classification between regular and chaotic behavior in quantum billiard models with remarkably high accuracy. We use the variational autoencoder for autosupervised classification of regular/chaotic wave functions, as well as demonstrating that autoencoders could be used as a tool for detection of anomalous quantum states, such as quantum scars. By taking this method further, we show that machine-learning techniques allow us to pin down the transition from integrability to many-body quantum chaos in Heisenberg XXZ spin chains. For both cases, we confirm the existence of universal W shapes that characterize the transition. Our results pave the way for exploring the power of machine-learning tools for revealing exotic phenomena in quantum many-body systems.	Understanding the properties of quantum matter is an outstanding challenge in science. In this work, we demonstrate how machine learning methods can be successfully applied for the classification of various regimes in single-particle and many-body systems. We realize neural network algorithms that perform a classification between regular and chaotic behavior in quantum billiard models with remarkably high accuracy. By taking this method further, we show that machine learning techniques allow to pin down the transition from integrability to many-body quantum chaos in Heisenberg XXZ spin chains. Our results pave the way for exploring the power of machine learning tools for revealing exotic phenomena in complex quantum many-body systems.
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