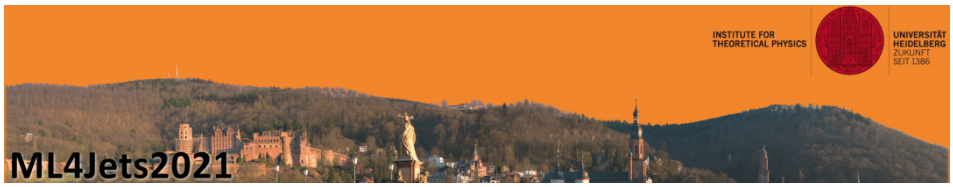

Contribution ID: **50** Type: **not specified**

Symmetry Discovery with Deep Learning

Thursday, 8 July 2021 09:40 (20 minutes)

Symmetries are a fundamental property of functions applied to datasets. A key function for any dataset is the probability density, and the corresponding symmetries are often referred to as the symmetries of the dataset itself. We provide a rigorous statistical notion of symmetry for a dataset, which involves reference datasets that we call inertial in analogy to inertial frames in classical mechanics. Then, we construct a novel approach to automatically discover symmetries from a dataset using a deep learning method based on an adversarial neural network. We show how this model performs on simple examples and provide a corresponding analytic description of the loss landscape. Symmetry discovery may lead to new insights and can reduce the effective dimensionality of a dataset to increase its effective statistics.

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Session Classification: Exploring the Latent Structure of Data