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Forward Model the Universe in the Era of Deep Learning

Friday, 15 December 2023 09:20 (20 minutes)

Rapid advances in deep learning have brought not only myriad powerful neural network models, but also breakthroughs that benefit established scientific research. In particular, automatic differentiation (AD) tools and computational accelerators like GPUs have facilitated forward modeling of the Universe with differentiable simulations. I will talk about our recent progress on developing computation and memory efficient simulation based modeling at the field level, with accuracy highly optimized by combining differentiable physical models, trainable neural networks (with physical inductive biases including symmetry and dimensional analysis), and symbolic regression.

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Session Classification: Cosmology with large-scale structure