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[colloquium] Prospects for understanding the physics of the Universe

Thursday, November 17, 2022 3:00 PM (1h 20m)

The remarkable progress in cosmology over the last decades has been driven by the close interplay between theory and observations. Observational discoveries have led to a standard model of cosmology with ingredients that are not present in the standard model of particle physics –dark matter, dark energy, and a primordial origin for cosmic structure. Their physical nature remains a mystery, motivating a new generation of ambitious sky surveys. However, it has become clear that formidable modelling and analysis challenges stand in the way of establishing how these ingredients fit into fundamental physics. I will discuss progress in harnessing advanced machine-learning techniques to address these challenges, giving some illustrative examples. I will highlight the particular relevance of interpretability and explainability in this field.

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