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Learning Gravity from Data: Model-Independent Reconstruction of the Cosmic Expansion and Modified Gravity Theories

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The standard cosmological model is under increasing observational pressure. Persistent tensions in the Hubble constant and the growth of structure suggest either unaccounted systematics or genuine new physics beyond ΛCDM — and distinguishing between these possibilities demands data analysis methods that do not smuggle in theoretical priors through the back door. In this talk, I present a programme of model-independent reconstruction of late-time cosmology using machine learning to probe both the expansion history of the Universe and the underlying theory of gravity.

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