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Soft matter physics as a joint between deep learning and renormalisation group

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The ideas at the heart of the renormalisation group have greatly influenced many areas of Physics, in particular field theory and statistical mechanics. In the course of the past few decades, the field of coarse-graining in soft matter has developed at an increasingly high pace, leveraging RG-like methods and tools to build simple yet realistic representations of biological and artificial macromolecules, materials, and complex systems. The button-up parametrisation of low-resolution models and the study of a system's properties in terms of its coarse representations have greatly benefited from the theoretical machinery of RG. More recently, machine learning is entering the field of soft matter modelling as a key player, as both an instrument and an object of study. In this talk, I will illustrate the role of RG and ML in the context of soft matter, and discuss possible avenues for further developments.

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