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Generating configurations of increasing lattice size with machine learning and the inverse renormalization group

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The renormalization group is a powerful technique in studies of phase transitions but manifests one limitation: it can only be applied for a finite number of steps before the degrees of freedom vanish. I will briefly discuss the construction of inverse renormalization group transformations with the use of machine learning which enable the iterative generation of configurations for increasing lattice size without the critical slowing down effect. I will then present an application of the inverse renormalization group in the case of spin glasses, which allows the construction of configurations for lattice volumes that have not yet been accessed by dedicated supercomputers.

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