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Abstract for an Invited Paper
for the MAR12 Meeting of
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Entanglement and real-space renormalization group methods for quantum field theories

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We will demonstrate how the reformulation of the density matrix renormalization group as a variational method within the class of matrix product states has lead to a wide class of novel applications and insights into strongly correlated quantum systems in 1 dimension. The discussion will detail the crucial role of entanglement and area laws, and then focus on the generalization of matrix product state methods to quantum field theories and the prospects of simulating experiments with cold gasses. Joint work with I. Cirac, J. Haegeman, T. Osborne.