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A new approach for studying large numbers of fermions in the unitary regime

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A novel lattice approach is presented for studying systems comprising a large number of interacting nonrelativistic fermions. The construction is ideally suited for numerical study of fermions near unitarity–a strongly coupled regime in which the s-wave scattering length is tuned much larger than all other physical scales. Such systems are experimentally accessible with trapped atoms, and provide a starting point for an effective field theory description of nuclear physics. I discuss the construction of our lattice theory which allows us to study systems of up to (but by no means limited to) 38 fermions with high accuracy and modest computational resources, and offer an overview of several applications of the technique. A detailed discussion of applications and simulation results will be described in companion parallel-session talks given by A. N. Nicholson and J-W. Lee.

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talk

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