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Quantum Monte Carlo simulations of complex Hamiltonians¹ VALERY ROUSSEAU, KALANI HETTIARACHCHILAGE, KA-MING TAM, JUANA MORENO, MARK JARRELL, Louisiana State University — In the last two decades there have been tremendous advances in boson Quantum Monte Carlo methods, which allow for solving more and more complex Hamiltonians. In particular, it is now possible to simulate Hamiltonians that include terms that couple an arbitrary number of sites and/or particles, such as six-site ring-exchange terms. These ring-exchange interactions are crucial for the study of quantum fluctuations on highly frustrated systems. We illustrate how the Stochastic Green Function algorithm with Global Space-Time Update can easily simulate such complex systems, and present some results for a highly non-trivial model of bosons in a pyrochlore crystal with six-site ring-exchange terms.

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