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Abstract for an Invited Paper
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Pair formation in Fermi systems with population imbalance in one- and two-dimensional optical lattices¹
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I will discuss pairing in fermionic systems in one- and two-dimensional optical lattices with population imbalance. This will be done in the context of the attractive fermionic Hubbard model using the Stochastic Green Function algorithm in $d=1$ while for $d=2$ we use Determinant Quantum Monte Carlo. This is the first exact QMC study examining the effects of finite temperature which is very important in experiments on ultra-cold atoms. Our results show that, in the ground state, the dominant pairing mechanism is at nonzero center of mass momentum, i.e. FFLO. I will then discuss the effect of finite temperature in the uniform and confined systems and present finite temperature phase diagrams. The numerical results will be compared with experiments.

¹With M. J. Wolak (CQT, National University of Singapore) and V. G. Rousseau (Department of Physics and Astronomy, Louisiana State University).