Unitary Regime of BCS-BEC Crossover:
Diagrammatic Determinant Monte Carlo

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The unitary regime of the BCS-BEC crossover can be realized by diluting a system of two-component lattice fermions with an on-site attractive interaction. We perform a systematic-error-free finite-temperature simulations of the system by diagrammatic determinant Monte Carlo. In the dilute regime, the method is orders of magnitude more efficient than alternative first-principle Monte Carlo schemes available up to date. Still, the computational complexity of the problem can only be met by most powerful vector supercomputers. We report the data obtained on the Cray X1 of the Oak Ridge National Laboratory.