

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Critical temperature and thermodynamics of the BEC-BCS crossover EVGENI BUROVSKI, Uni Greifswald, Germany, EVGENY KOZIK, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, UMASS Amherst, MATTHIAS TROYER, ETH Zurich — The strongly-correlated regime of the BCS-BEC crossover can be realized by diluting a system of two-component fermions with a contact attractive interaction and an appropriate ultraviolet regularization. We investigate this system via a novel systematic-error-free continuous-space-time diagrammatic determinant Monte Carlo method. The results allow us to predict the universal curve T_c/E_F as a function of the parameter $k_F a$ with the maximum on the BEC side. At unitarity, $T_c/E_F = 0.152(7)$. We also determine the thermodynamic functions and show how the Monte Carlo results can be used for accurate thermometry.

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Date submitted: 25 Nov 2007

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