

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Combining the density matrix renormalization group and truncated spectrum approach for two-dimensional strongly correlated systems

YURY ADAMOV, Texas A&M University, ROBERT KONIK, Brookhaven National Laboratory — We propose a combined numerical and analytical approach to two dimensional strongly correlated systems which are representable as arrays of one-dimensional exactly solvable systems. In our approach the exact solution provides us a compact representation of one-dimensional subsystems that makes it numerically feasible to treat the interactions between subsystems using a DMRG algorithm. This compact representation comes about through a simple truncation of the spectrum. To illustrate our approach, we consider an array of interacting quantum Ising chains. The results are then compared with an analytical RPA treatment of the same system.

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Date submitted: 03 Dec 2006

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