Grassmann Tensor Renormalization Group Study of Lattice QED with Theta Term in Two Dimensions

Yuya Shimizu\textsuperscript{a}\textsuperscript{∗} and Yoshinobu Kuramashi\textsuperscript{b,c,a},

\textsuperscript{a} RIKEN Advanced Institute for Computational Science, Kobe, Hyogo 650-0047, Japan
\textsuperscript{b} Graduate School of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8571, Japan
\textsuperscript{c} Center for Computational Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8577, Japan

We apply the Grassmann tensor renormalization group to two-dimensional lattice QED. The phase structure with one-flavor of the Wilson fermion, especially including a case with the $\theta$ term at $\theta = \pi$ is studied. We present numerical results of finite size scaling analyses.

References