Geometry Dependence of the Sign Problem VLADIMIR IGLOVIKOV, Physics Department, University of California, Davis, California 95616, USA, EHSAN KHATAMI, Department of Physics and Astronomy, San Jose State University, San Jose, CA 95192, USA, RICHARD FYE, RICHARD SCALETTAR, Physics Department, University of California, Davis, California 95616, USA — The sign problem is a fundamental limitation to Quantum Monte Carlo (QMC) simulations of the statistical mechanics of interacting fermions and frustrated quantum spins. We produced a comprehensive dataset on the geometry dependence of the sign problem for different densities, interaction strengths, inverse temperatures and spatial lattice sizes. We supplement this data with several observations concerning general patterns/trends in the data, including the dependence on spatial volume and how this can be probed by examining decoupled clusters, the scaling of the sign in the vicinity of a particle-hole symmetric point, and the correlation between the total sign and the signs of the individual spin up and spin down components.

Vladimir Iglovikov
Physics Department, University of California, Davis, California 95616, USA

Date submitted: 14 Nov 2014   Electronic form version 1.4