Contribution ID: **81** Type: **not specified**

Hybrid Monte Carlo on Lefschetz Thimbles – A study of the residual sign problem

Thursday, 20 February 2014 14:30 (30 minutes)

We consider a hybrid Monte Carlo algorithm which is applicable to lattice theories defined on Lefschetz thimbles. In the algorithm, any point (field configuration) on a thimble is parametrized uniquely by the flow-direction and the flow-time defined at a certain asymptotic region close to the critical point, and it is generated by solving the gradient flow equation downward. The associated complete set of tangent vectors is also generated in the same manner. Molecular dynamics is then formulated as a constrained dynamical system, where the equations of motion with Lagrange multipliers, are solved by the second-order constraint-preserving symmetric integrator.
The algorithm is tested in the lambda phi^4 model at finite density, by choosing the thimbles associated with the classical vacua for subcritical and supercritical values of chemical potential. For the lattice size L=4, we find that the residual sign factors are safely included by reweighting and that the results of the number density are consistent with those obtained by the complex Langevin simulations.

Presenter: Prof. KIKUKAWA, Yoshio (Institute of Physics, the University of Tokyo)