4 loops 3-d SU(3) free energy with a mass IR regulator

Presenter: Christian Torrero

F. Di Renzo, M. Laine, V. Miccio, Y. Schroeder, C. Torrero

Abstract: The SU(3) free energy can be studied by dimensional reduction to 3 - d, which results in less demanding non-perturbative lattice simulations. To connect to the complete theory the matching can be computed in perturbation theory. In the dimensional reduced theory the free energy displays an IR singularity at the fourth loop. Since both a lattice and a continuum computation are needed, the same IR regulator must be introduced. We therefore use a mass regulator to perform Numerical Stochastic Perturbation Theory computations. Covariant gauge fixing is obtained in the Faddeev-Popov scheme without introducing any ghost field.