Contribution ID: **33** Type: **not specified**

The density of states approach for the simulation of finite density quantum field theories

Thursday 4 December 2014 14:30 (35 minutes)

Finite density quantum field theories have evaded first principle Monte-Carlo simulations due to the notorious sign-problem. The partition function of such theories appears as the Fourier transform of the generalised density-of-states, which is the probability distribution of the imaginary part of the action. With the advent of Wang-Landau type simulation techniques and recent advances [1], the density-of-states can be calculated over many hundreds of orders of magnitude. Current research addresses the question whether the achieved precision is high enough to reliably extract the finite density partition function, which is exponentially suppressed with the volume. In my talk, I review the state-of-play for the high precision calculations of the density-of-states as well as the recent progress for obtaining reliable results from highly oscillating integrals. I will review recent progress for Z3 and phiˆ4 quantum field theories for which results can be obtained from the simulation of the dual theory, which appears to free of a sign problem.

[1] K Langfeld, B Lucini, A Rago, Phys .Rev. Lett. 109 (2012) 111601.

Author: LANGFELD, Kurt (Plymouth University)

Co-authors: RAGO, Antonio (Plymouth University); LUCINI, Biagio (Swansea University); BONGIOVANNI, Lorenzo (Swansea University); PELLEGRINI, Roberto (University of Edinburgh)

Presenter: LANGFELD, Kurt (Plymouth University)

Session Classification: Parallel 5: Strongly coupled gauge theories