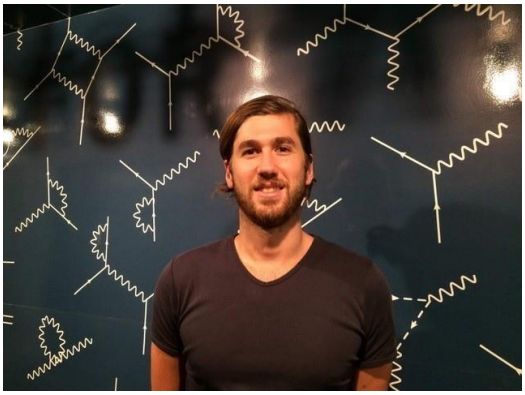
LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

Theory Seminar



Murat Kologlu

Caltech

The Conformal Bootstrap at Finite Temperature and the 3d Ising CFT

Many properties of conformal field theories (CFTs) have been uncovered by the conformal bootstrap in the past decade. The focus has mostly been on bootstrapping flat-space four-point functions for the local data: spectra and OPE coefficients. Can we extend the bootstrap program to CFTs on nontrivial manifolds? Recently, we took the first step in this direction by studying CFTs on a Euclidean circle times flat space, corresponding to putting the Lorentzian CFT at finite temperature. I will explain how to bootstrap thermal CFT two-point functions to solve for the thermal averages of local operators. I will describe analytic techniques such as the "thermal Lorentzian inversion formula" and a large-spin perturbation theory for the thermal data. Finally, I will apply these techniques to approximately solve the thermal bootstrap for the 3d Ising CFT and obtain predictions for the thermal averages of infinitely many operators, including a prediction for the free energy density.

Friday, October 19, 2018
12:30pm
401 Physical Sciences Building

LEPP, the Cornell University Laboratory for Elementary-Particle Physics, and CHESS resources have merged and a new lab, (CLASSE), has formed. LEPP's primary source of support is the National Science Foundation. Visit us at www.lepp.cornell.edu