



Lecture Course in the Integrated Research Training Group (IRTG)
of the SFB 676 "Particles, Strings and the Early Universe"

Summer Term 2017

Introduction to Conformal Field Theory

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Course Description:

Scale invariant quantum systems play an important role in many different areas of science. In particular, they describe the low energy physics of many quantum field theories as well as the critical behavior of second order phase transitions. After discussing a few important examples from quantum field theory and statistical physics, the basic notions of conformal symmetry and operator product expansions are introduced. The second part then focuses on conformal field theories in $d = 2$ dimensions where the conformal group gets enhanced to a Virasoro symmetry. With some background from mathematics, which will be developed in detail, many such theories can be solved exactly. In the third part, the course proceeds to conformal field theories in dimension $d > 2$ and the so-called conformal bootstrap programme. After a detailed introduction to conformal blocks and the crossing symmetry constraint, the course concludes with recent results e.g. on calculation of critical exponents in the 3-dimensional Ising model. Some background from quantum field theory and group theory are helpful but not mandatory.

Prerequisites:

Undergraduate courses in theoretical physics

Date and Place:

Mon, 14:00 – 16:00, SR 1, Building 1

Starting on:

3 April 2017