

19 Curricular Unit

Advanced Physics Topics 1

Module

Introduction to two-dimensional conformal field theory (ICFT)

Type

Tutorial: Reading and Study assignment

Contact hours

18

Professor/Researcher in charge

Miguel Costa (U. Porto) and Joao Penedones (EPFL)

Summary of Contents

- 1. Conformal invariance in two dimensions:** the conformal group, global conformal transformations, conformal generators, primary fields, correlation functions, Ward identities, operator product expansion, central charge, free boson and free fermion.
- 2. The operator formalism:** radial quantization, Virasoro algebra, compactified free boson, normal ordering, conformal families, conformal blocks, crossing symmetry and the conformal bootstrap.
- 3. Minimal models:** Verma modules, Kac determinant, unitary minimal models, Yang-Lee singularity, Ising model, tricritical Ising model, three-states Potts model, singular vectors, differential equations for correlation functions, fusion rules.
- 4. The Coulomb-gas formalism:** Vertex operators, background charge, screening operators, four-point functions in minimal models.

References

“Conformal Field Theory”, Di Francesco, Mathieu and Sénéchal, Springer-Verlag New York 1997

Evaluation

Problems solved and presented by the students during the course.

Juri

Miguel Costa, João Penedones (EPFL), João Rosa