

FIELDS and PARTICLES

[Joanes Lizarraga and Asier Lopez-Eiguren]

Symmetries: Global and Local symmetries. Spontaneous symmetry breaking. Goldstone bosons.

Higgs mechanism.

Electroweak Theory.

Standard Model.

Topological Defects: Domain walls, cosmic strings, magnetic monopoles.

Early Universe: Overview of the thermal history of the universe. Early universe thermodynamics.

Brief introduction to a selection of other topics that include:

QCD.

Supersymmetry.

Dark Matter.

Dark Energy.

Inflation.

Basic bibliography:

- **Peskin and Schroeder**, An introduction to Quantum Field Theory
- **W. N. Cottingham and D. A. Greenwood**, An introduction to the Standard Model of Particle Physics.
- **F. Halzen and A.D. Martin**, Quarks and Leptons: An introductory course in modern particle physics.
- **E. Kolb and M. Turner**, The Early Universe.
- **A. Vilenkin and E.P.S. Shellard**, Cosmic Strings and other topological defects.

- **A. Zee**, Quantum Theory in a Nutshell.

Assessment by a combination of presentations and an exam.