

INTRODUCTION TO GAUGE THEORIES

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This course consisted of six lectures in which the following subjects were illustrated:

1. Flavour chiral symmetry for quarks and leptons.
2. Extending a global into a local symmetry: the basic structure of a Yang-Mills theory.
3. The search for the weak interaction group from earlier data: $SU(2) \otimes U(1)$.
4. Spontaneous symmetry breaking and the masses of W, Z, and the fermions.
5. Grand unification: the case of $SU(5)$.
6. Proton instability, neutrino and neutron oscillations.

The level of the course was elementary and the greater part of the material presented can be found in existing literature. Those who are particularly fond of my style of writing can find 90% of the course by putting together Refs. 1 and 2, and Ref. 3 (where the influence of M.K. Gaillard has particularly improved the situation).

Many lecture notes of other authors exist^{4,5}) on the same subjects, notably in the Proceedings of previous CERN Schools of Physics.

Finally, more advanced accounts of the mathematical structure of gauge theories can be found in Refs. 6 and 7.

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REFERENCES

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- 2) L. Maiani, Lectures given at the Ecole d'Eté de Physique des Particules, Gif-sur-Yvette, 1979.
- 3) M.K. Gaillard and L. Maiani, Lectures given at the Ecole d'Eté de Physique théorique, Cargèse, 1979.
- 4) J. Ellis, preprint CERN-TH.2942 (1980), Lectures given at the 21st Scottish Universities Summer School in Physics, St. Andrews, 1980.
- 5) C. Jarlskog, Proc. CERN School of Physics, Windermere (England), 1974 (CERN 74-22, Geneva, 1974), p. 1.
J. Iliopoulos, Proc. CERN-JINR School of Physics, Nafplion (Greece), 1977 (CERN 77-18, Geneva, 1977), p. 36.
- 6) E.S. Abers and B.W. Lee, Phys. Reports 9, 1 (1973).
- 7) J.C. Taylor, Gauge theories of weak interactions (Cambridge Univ. Press, Cambridge, 1976).