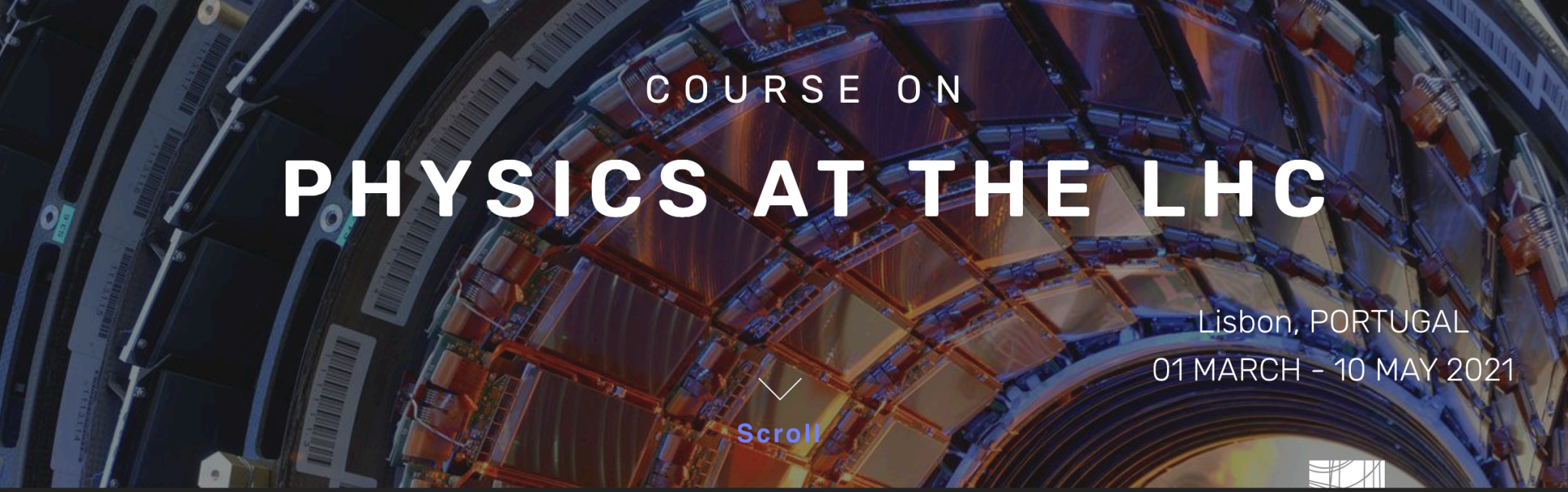

http://events.idpasc.lip.pt/LIP/events/2021_lhc_physics/index.php?p=index

Introduction

- Specialized course on the Physics at the Large Hadron Collider organized by LIP in the framework of IDPASC
- The goal of the Course is to introduce the physics, analysis methods, and results of the LHC experiments
- Emphasis is placed on the search for new physics
- Benchmark channels in proton-proton collisions will be discussed:
  - identification of the objects involved
  - signal and background properties
  - background estimation and S/B discriminants
  - estimation of systematical errors
  - extraction and interpretation of the final results

Introduction (cont.)

- Course intended for under-graduate or graduate students with basic training in Particle Physics

- *Basic concepts*
- Elementary constituents of matter and interactions. Quantum numbers and conservation rules. Spin and symmetry groups. Relativistic kinematics. Cross-section. Natural units. Mass and lifetime. Resonances.

- *Structure of matter*
- Elastic scattering and form factors. Inelastic scattering experiments. Nucleon structure functions. Scale invariance. Quark model. Parton distribution functions. Introduction to QCD.

- *Fundamental interactions*
- Introduction to QED. Fermi interaction. Parity violation. Currents V-A and weak doblets. W and Z bosons. Cabibbo angle. Neutral currents. Electroweak interaction. Gauge symmetries. The Higgs mechanism. Weinberg-Salam model. CP violation.

bibliography

- F. Halzen and A.D.Martin, ' Quarks and Leptons ', John Wiley and Sons (1984)
- D. Griffiths, ' Introduction to Elementary Particles ', John Wiley and Sons (1987)
- B.R.Martin, G. Shaw, ' Particle Physics ', John Wiley and Sons (1999)

Course certification

- Will provide *Certificate of Attendance* to those who attend at least 80% of the lectures

- Recognized as a course at IST (with *credit*) for those:
  - Who will attend at least 80% of the lectures
  - Who will pass a final exam (give a short seminar and Q&A session)
  - Registered under ``Topicos em Fisica de Particulas”